THE

VETERINARY JOURNAL

NOVEMBER, 1905.

Editorial.

LADY VETERINARY GRADUATES.

THE election of Miss Cust to the position of Veterinary Inspector to the Mount Bellew District of the County of Galway, will again bring up the question of admitting ladies to the examinations of the Royal College of Veterinary Surgeons, for before the appointment can become legal it is necessary that it shall be confirmed by the Department of Agriculture in Dublin. Knowing the usual determination of character so generally associated with the Irish temperament, the situation becomes very interesting to the onlooker. If the Department of Agriculture sanction the appointment, it is naturally to be supposed that they will lend their weight and influence to support their Veterinary Inspector, in case the Council of the Royal College are asked to forbid the official use of the application of the word "Veterinary" to a person not a M.R.C.V.S.; if they refuse to sanction the appointment, it is not too much to surmise that a wordy warfare is likely to take place between the authorities in Dublin Castle and those of county Galway, and it is possible that the latter may, in true Irish fashion, find some solution which will allow them to maintain their choice. Lady veterinary students are not yet permitted to present themselves before the Examining Board of the Royal College of Veterinary Surgeons, as in the test case which was tried in a Scotch Court it was held that the term "student" implied "male" student when applied from a veterinary aspect. It is a pity that the matter was not tried in the English Courts, for the opinion of a most eminent King's Counsel has been given that if properly thrashed out such an interpretation could no more hold good in the veterinary than it does in the human medical profession. It is only a few years ago that the first lady doctor

graduated, and this in the face of the most bitter opposition ; at the present day the lady doctor holds her own on an equality with her male *confrère*, and the work done at the Women's Hospitals and Medical Schools is in every way as good as that of any other. For canine work in particular the lady veterinary graduate would be eminently fitted, and in Veterinary State Medicine Russia has already taken the lead, by appointing a lady graduate of the Alfort School to the Veterinary Inspectorship of a district. Two ladies have graduated from Alfort; several of the American colleges admit lady students, and one English aspirant has recently left this country and entered the American Grand Rapids College (a three years' course) in order to obtain a veterinary qualification and the necessary knowledge to practise. Even in Australia the lady graduate is allowed, a lady veterinary student being now about to present herself at Melbourne, after a successful college career, for the final examination, which will give the necessary permission to practise there. At the International Veterinary Congress in Buda-Pesth one of the most eminent speakers and enthusiastic workers in the pathological section was a lady, and the time is sure to come when our profession in England will be compelled to throw open its doors equally wide to students of both sexes.

CONTAGIOUS ANIMAL DISEASES IN LONDON.

THE report of the Public Control Committee (from which we give an extract in this month's Journal) of the London County Council of 1904-1905, has recently been issued, and it proves very interesting reading. With one exception, viz., that of glanders, it can be said to be satisfactory. Rabies is non-existent, and it is pleasing to read that since 1898 no case has been recorded in the County of London. Under the present regulations for the control of dogs about 20,000 stray dogs are annually destroyed in the Metropolis—a terrible destruction of those animals so generally spoken of as "the friends of man!" Doubtless in the future some way will be found to overcome this useless waste of life.

Anthrax, as might be expected, gives a very small mortality, only four horses having been reported as dying from this disease.

Three outbreaks of swine fever were also dealt with satisfactorily.

As affected, or in consequence of contact, with epizootic lymphangitis, some 126 horses had to be slaughtered. By the adoption of rigorous measures it may now fairly be stated that this new terror to the equine community is under control, and it may

legitimately be expected that the report, when it is issued, of 1905-1906 will relegate this disease amongst those of the past. The tabulated official statistics of the Army show in England alone, between September, 1902, and July, 1905, no less than 495 cases were diagnosed, and that 393 of these were destroyed, a very small percentage being ultimately considered as cured. Had these animals been sold whilst in the incubative and undiagnosable stage, the civilian horse-owning public must have suffered enormous losses. The success which has attended the efforts to eradicate the disease is a still further testimony to the value of a properly organised veterinary department wherever animals are concerned.

Glanders, as usual, is still with us, the numbers of infected horses in 1904-1905 giving the third highest average of any during the past ten years. The compensation paid amounted to nearly £5,500, and we are no nearer the eradication of this disease than before ; as stated in the report, it is still very unsatisfactory to see that the annual total has nearly doubled since 1894, when the present Glanders Order came into operation. The statistics show that nearly 90 per cent. of the total number of outbreaks were reported from London and the Home Counties, London being the great centre of the disease, and it is quite obvious that the present law is totally inadequate.

According to the report, the London County Council blame the regulations of the Board of Agriculture, and ask for greater powers in the use of mallein and in the dealing with in-contact animals. The amendments they ask for are as follows:—(1) Compulsory notification of the disease by veterinary surgeons. (2) Legal recognition of a reaction to mallein as diagnostic of glanders. (3) Power to deal with in-contact horses.

These are the very least of the regulations necessary to be put into force if glanders is to be stamped out of London.

At the present time notification is compulsory on the part of the owner only, and if it was also done by his veterinary surgeon a double safeguard would be produced.

Mallein has long been recognised by every up-to-date member of the profession, and at the present day it ought not to be necessary for the County Council to insert such a clause as the second one. Even the lay horse-owning public, in London at all events, and certainly every cab proprietor, can talk about mallein and its wonderful diagnostic value. The range of power to deal with in-contact horses should undoubtedly be wider, and the administration of this clause should be largely left to the discretion of the individual inspector.

THE EIGHTH INTERNATIONAL VETERINARY CONGRESS.*

THE eighth International Veterinary Congress was held last month at Buda-Pesth, the capital of Hungary, under the presidency of Professor Hutyra, whose photograph we give on the front page of the Journal. The success of the gathering was undoubtedly due in a great measure to the untiring efforts of this gentleman and to that of the General Secretary, Dr. Stefan de Ràtz. Nearly 1,500 members were present, about 800 of these being veterinary surgeons; the remainder consisted of medical men, representatives or delegates of governments, universities, and agricultural societies or colleges, whilst there were a number of chemists and those interested in agriculture. Ladies were also admitted, and many of the members had brought their wives and daughters.

Japan and China had sent representatives, and others had travelled from South Africa, South America, the United States and Egypt, in order to be present, whilst every civilised European power had sent its veterinary officials.

As might be expected, the German, Austrian, and Hungarian delegates preponderated, and to this must be attributed the fact that by far the greater portion of the discussions was carried out in the German language. Unfortunately official interpreters were not provided, as had been done on the previous occcasion at Baden-Baden, and those who could not readily understand the German speeches were dependent on the kindness of some of the other members present to translate and re-render their meaning.

The English delegates were Professors McFadyean and Stockman, who represented the Board of Agriculture; Professor Mettam, who was sent by the Department of Agriculture for Ireland; Mr. Malcolm, who is the delegate of the National Veterinary Association; and Professor Hobday, who was sent by the Central Veterinary Medical Society. The remainder of the English-speaking party consisted of Miss Cust, Mr. J. A. W. Dollar (the late President of the Royal College of Veterinary Surgeons), Major and Mrs. Woollatt (Natal), Dr. and Mrs. Theiler (Transvaal), Dr. Leonard Pearson and Messrs. Kelly and Moore (all of America), and Dr. Bitter and Mr. Littlewood who represented Egypt; whilst the party were joined in Buda-Pesth by Mr. J. W. Reynolds, M.R.C.V.S., an English graduate, who is now practising in Totis, the "Newmarket" of Hungary.

On Saturday, September 2, at 8 o'clock in the evening, the Congress was informally opened by a conversazione in the banqueting hall of the Royal Hotel, and this gave an opportunity for the members to look round and renew a few friendships.

On the following day at 11 a.m., in the gardens of the Veterinary School, a monument was formally unveiled to the memory of Professor Azary, one of their late teachers. At 4 o'clock p.m., the Minister of Agriculture formally opened the Congress in the banqueting hall of the Hungarian Academy of Sciences. This gentleman was particnlarly gracious to the English-speaking delegates and welcomed them in their own language, having spent a portion of his official life in

** For the photographs illustrating this article we are indebted to Miss Aleen Cust.*

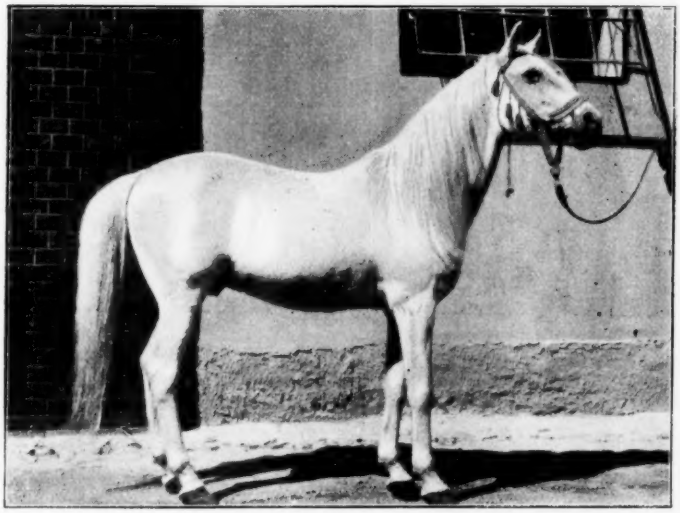

FIG. 1.—A pure-bred Arab stallion.

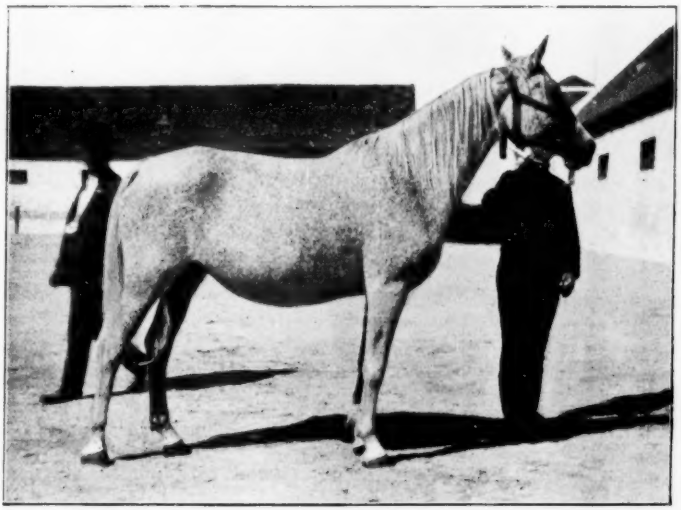

FIG. 2.—A pure-bred Arab mare. One of two which the Director himself (an Arab by birth) secretly managed to bring away from Arabia.

FIG. 3.—An Ardenner Mare.

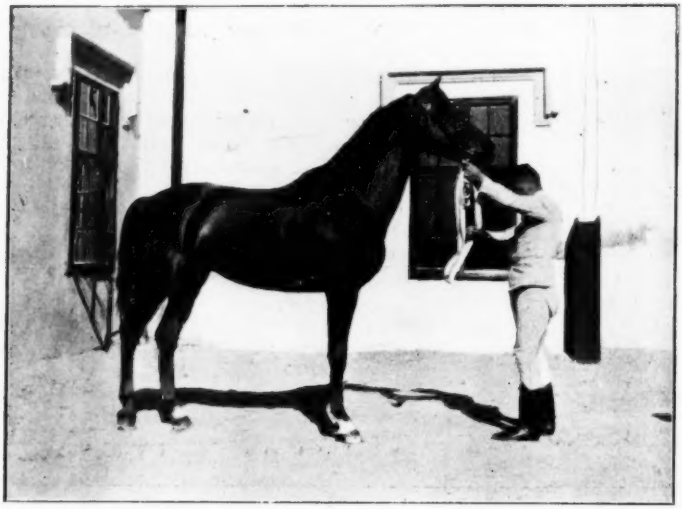

FIG. 4.—A fair type of the half-bred Stock.

England. In the evening His Imperial and Royal Highness the Archduke Josef, as Patron of the Congress, held a reception of all the foreign delegates and representatives in the palace, which was brilliantly lighted and illuminated for the occasion.

On Monday the serious business of the Congress commenced with a meeting of the Veterinary Police Section in the chamber of the former Houses of Parliament. The subjects particularly dealt with here were those of the insurance of animals both for private and State purposes, and in the afternoon a scheme was presented for endeavouring to obtain periodical veterinary sanitary returns.

The sections of the Congress were entirely restricted to matters which could be connected with biological, pathological or veterinary sanitary subjects, whilst a special portion was set aside for veterinary tropical diseases.

The question of milk and its treatment for human consumption in accordance with modern hygienic requirements, together with its food value for cattle and swine, was fully discussed on Tuesday morning, and the afternoon was devoted to the adulteration of meat and meat products.

In another building, on the same day, tuberculosis excited the greatest interest, and no time was lost between the speeches. Wednesday, September 6, was also devoted to this subject, the particular headings laid down for discussion being three, viz., the means to be taken for the suppression of tuberculosis amongst domesticated animals, protective inoculation in cattle against tuberculosis, and thirdly, the establishment of uniform principles for judging reactions of tuberculin and mallein.

The subject of the difference stated by Koch and Schütz to exist between bacilli of human and cattle tuberculosis was energetically combated, and it was unanimously agreed that the organism which could be found in the system of either the human being or the tuberculous cow were one and the same.

The question of the occurrence of cancer in the domesticated animals was dealt with on Thursday, and gave rise to a good discussion, as did also the section on tropical diseases. In the latter the English-speaking members took a prominent part, Dr. Theiler, Mr. Woollatt and Professor Stockman being able to relate their actual experiences from their long residence in South Africa.

The social entertainments were in every way a success, and something of interest was provided for each evening.

A second reception was held in the rooms of the Agricultural Museum by the Minister of Agriculture, and at this he was kind enough to invite a number of English delegates to dine with him on a subsequent evening. A night excursion was arranged on the Danube, the banks being illuminated by fairy lights and Chinese lanterns, whilst there were social gatherings on Margaret Island and in the park.

The weather was perfect, the only fault, if any, being that it was a little too hot for those accustomed to English temperature.

The Municipalities of Buda-Pesth did everything in their power to give a welcome to the members of the Congress, and the Congress badge formed a ready means of entrance to the public buildings and other places of interest. On all sides, amongst all classes of the people, there was easily recognised a kindly feeling towards the Congressists.

FIG. 5.—A prize bull, at work; illustrating, too, the pattern of farm cart.

FIG. 6.—Hungarian oxen, yoked together for draught work.

The Buda-Pesth Veterinary School was, of course, a special object of interest, and the buildings, particularly the Anatomical Museum, were much admired. Amongst the living patients was a bull 6 years old with *ectopia cordis*, the heart being distinctly perceptible in the region of the dewlap. The animal was apparently in perfect health and had been in possession of the College authorities for the past five years.

The College course extends over four years, and the matriculation examination is of a high standard. There are at the present time about three hundred students, and those whom we saw appeared to be keen on their work and exceedingly up to date.

In the surgical wards wherever there were large wounds we noticed that the razor had been freely used around the edges, and every precaution taken to aid antiseptic union.

The operating theatre was well fitted up and exceedingly clean and neat. It was so arranged, all under cover, that a large class of students could see everything which was going on; the larger patients were cast on a leather mattress, and the dogs and smaller animals held for operation on a metal-covered table. There was a plentiful supply of hot and cold water, and the conditions as compared with the methods of casting on a straw bed were certainly much more ideal for performing an operation antiseptically.

The Bacteriological Department was situated about a couple of miles outside the town, and this was visited separately, every courtesy for a thorough inspection being provided by the director, Professor Preisz.

The whole of the arrangements are subsidised by the Government, the advantage of this being very evident in the prodigality of apparatus and such like necessary accompaniments to the working of such institutions. The teaching fees are very low and the students are encouraged to a much greater extent than in any private institution.

The slaughter-houses in Buda Pesth were well worth a visit, as there we saw many thousands of different varieties of cattle. Many of them came from Servia, and the official who took us round stated that these were the healthiest cattle in Europe, and that amongst them they only found about 1 per cent. of tuberculosis; some of the long-horned Hungarian breed were enormous beasts, and there were also a fair sprinkling of buffaloes. All the cattle seemed to be exceptionally quiet.

The slaughter of pigs was done in rather a brutal fashion, the animals not being stunned in any way before their throats were cut, and the sight of several large pigs racing about, squealing, and with blood pouring from their throats for several minutes, was, to say the least of it, unpleasant. The breath was scarcely out of their bodies before they were hauled up and dropped into the scalding tub.

The cattle market has thirteen veterinary inspectors, whose duty consists in examining the meat and passing it as fit for human food. In a corner of the market was the "Freibank," where poor people may buy soup or meat of second quality at a small price; this being from the flesh of animals which have been condemned for certain reasons and thoroughly sterilised before it is allowed to be sold.

Probably the most interesting part of the whole Congress to the

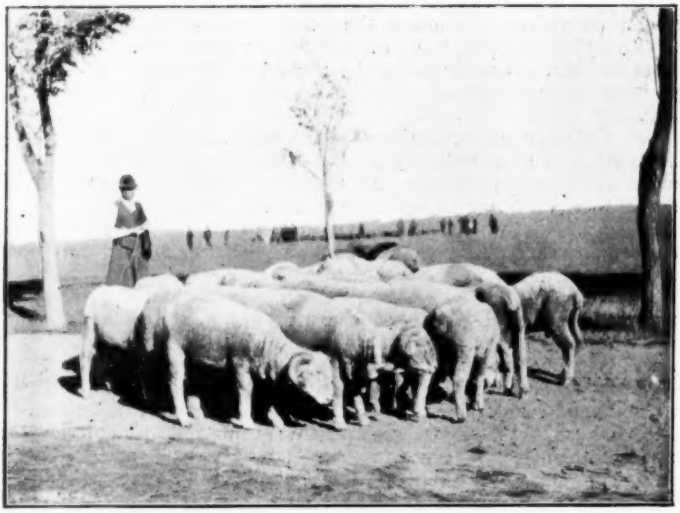

FIG. 7.—Rambouillet sheep.

FIG. 8.—Hungarian breed of pigs; with long hairy coats.

English section was the excursion to the royal studs and farms. Of these there were choice of three: the first to Lake Balaton, to the royal studs at Kisber and Bábolna, and the large dairy farms of the Archduke at Magyar-Ovàr; secondly, an excursion to Mëzohegyes; or thirdly, to Debreczen and the great Hungarian plains.

Those of the English party who remained for the excursions, consisting of Miss Cust, Messrs. Stockman, Malcolm, and Hobday, joined the first. Leaving Buda-Pesth about half-past five on Saturday evening, September 9, the party, forty-four people altogether, travelled by train to Siefok, a small village on the side of Lake Balaton, where accommodation was provided for the night. On the following morning a steamboat trip was made across the lake, visits being paid to Balaton-Furet and Balaton-Földvar, where there were large bathing-sheds, and many of the company took the opportunity to have a swim. Balaton-Földvar stands very much to Buda-Pesth in the same light as Brighton does to London, and is utilised as a favourite summer resort. Lunch had been arranged here, and the remainder of the day was spent on the steamer on the lake in order to admire the scenery. Lake Balaton is nearly sixty miles in length, and is the largest fresh-water lake in central Europe.

On Monday, the 11th, the party started for Kisber, being met at the station by some twenty of the royal carriages with coachmen in full livery. Here we were shown some very fine horses and mares, including a large number of English thoroughbreds. Two hundred and forty soldiers are in regular attendance as grooms and servants at the studs, and in winter-time the number is increased to five hundred. These are commanded by a colonel and four other officers, whilst two veterinary surgeons devote their whole time to the health of the animals.

After inspecting the thoroughbred and half-bred horses, we were taken to see the farm buildings and other paddocks. In one place there were about forty Ardenner horses, mares, and foals, these being (as seen in one of the photographs, a type of cart-horse not quite so large as our English Shire. In another shed were some twenty blood mares and foals, and about fifteen others were expected to foal before the end of October. The cattle-sheds were large and roomy, and the animals themselves were fine specimens. In some of the Hungarian breeds it was quite impossible to touch the tip of each horn with outstretched hands. The principal milking breeds were the Simmenthaler (Swiss) and the Bonyad.

The sheep and pigs were not, to English ideas, quite of the best quality.

On Tuesday, starting at 6 a.m., we were driven to see the Arab stud at Bábolna, and this was undoubtedly the most enjoyable day of the whole trip. The head of the stud, a colonel in the Austrian army, was an Arab who came over there some thirty years ago as a boy with some Arab horses. By his intelligence and attendance to duty he had so gained the confidence of the Austrians that he now ranks as colonel in the army and Director of the Arab stud. Truly fond of his horses, he seemed to know every one, and they on their part appeared to heartily reciprocate his affection.

He had altogether about 800 horses under his control, these including about fifty beautiful Arab stallions. There were also two pure-

bred Arab mares which had been obtained from Arabia by the director himself only after the greatest difficulty. The yearlings and two-year-olds seemed to be absolutely without fear or vice, nestling round the men in a whimpering group when called. In fact, all the horses seemed to behave as if kindness was the only method by which they were trained and taught, apparently reposing every confidence in their attendants.

A rather interesting ceremony took place in one of the brood-mare sheds just as the members of the party entered the building; one of

FIG. 9.—Hungarian Csikós, or military rough-rider, with a "karikás" or long stock-whip round his shoulders.

the mares gave birth to a foal, and the little animal was christened "Congressus," the interpreter of the party expressing the wishes of everybody that its life might be a fortunate one.

The following day, September 13, was spent in a visit to the domains of the Archduke at Hegyeshalon, where there were about 5,000 cattle. We were informed that only five years ago 90 per cent. of the cattle on the farms were tuberculous, and that now, by following Professor Bang's methods, the dreaded disease had almost disappeared. The calves are all removed from the cows as soon as born,

and fed in a most ingenious manner, with artificial foster-mothers, on Pasteurised milk. The dairy portion of the farm is the largest of the kind in Europe and employs about 1,000 people. Everything about the place was conducted on high sanitary and hygienic principles, the cattle being regularly groomed, the cowsheds clean and lofty, and the milking utensils scrupulously well kept. Altogether, it seemed

FIG. 10.—A group of true Magyar Gipsies.

impossible to find any faults. It was interesting, too, to see the Indian corn growing in the fields, ripe and ready to gather, and to see the method of harvesting.

It was with regret that the party found the time draw near to separate, a universal wish being expressed that we might all meet again at the next Congress.

Original Articles.

ACCIDENTS AND SEQUELÆ OF SURGICAL OPERATIONS.*

BY L. A. MERILLAT, V.S., CHICAGO, ILL.

(A Paper presented to the 42nd Annual Meeting of the American Veterinary Medical Association, at Cleveland, Ohio, Aug. 15-18, 1905.

THE old adage that accidents will happen is not idle talk when applied to veterinary surgical operations. The accidents liable to occur during operations and the post-operative sequelæ are circumstances of no small import. They underlie the very life of surgery, and especially veterinary surgery. As a subject for discussion, they deserve the highest and most scrupulous consideration. In practice they must be obviated at every time. The old practitioner knows too well that a brilliant surgical career is promptly shattered by a few misfortunes belonging to this category. While it is admitted that each surgical procedure has its share of accidents and sequelæ in spite of efforts to prevent them, this fact must not be made an excuse for the use of surgical methods that are of questionable rationality, and through which the percentage of accidents and sequelæ is raised above the normal number. To prevent accidents and sequelæ is, in fact, the surgeon's most potent mission. To lessen their frequency is to succeed as a surgeon; to augment them means disaster.

Each surgical operation should be approached with due regard to these two items, whether the possible consequences are of the grave or trivial character. A trivial accident may be as serious a matter in a valuable animal as a graver one would be in an animal of small value.

Aside from the accidental injury of important organs with the surgical instruments in hand, the chief accidents occurring in veterinary operations are those incident to restraint, which will forthwith receive our consideration.

ACCIDENTS OF RESTRAINT.

The large subjects (the horse and ox), owing to the use of their powerful muscles to fight forcible restraint, are the most frequently injured. The small animals (dog and cat) are seldom caused to suffer bodily injury by forcible confinements for a surgical operation. We have in mind in our practice but a single accident to a dog from surgical restraint, and that one resulted in the death of a small Boston terrier puppy from suffocation by flexing the neck too firmly while under restraint to have its ears trimmed. We have since learned that this accident occurs frequently, and that each surgeon who practises trimming ears of dogs to a large extent has killed at least one dog in this manner.

Restraining the horse is entirely a different proposition. In the recumbent position there is eminent danger of inflicting serious injury to the locomotory apparatus, and also the internal organs, while in the standing position there is always some possibility of straining or

* From the *American Veterinary Review.*

bruising some part of the body. The accidents we have had during the past seventeen years, enumerated in the order of their frequency and importance, are :—

(1) Fracture of the lumbar vertebræ.
(2) Fracture of the femur.
(3) Azoturia.
(4) Facial paralysis.
(5) Brachial paralysis.
(6) Fracture of the ilium.
(7) Injury to the temporal-mandibular articulation.
(8) Exhaustion, collapse and shock.
(9) Internal hæmorrhage.
(10) Colics of the trivial character.
(11) Grave colics and rupture of the abdominal viscera.

Fracture of the Lumbar Vertebræ.—This is one of the most serious, most unfortunate and most common of all the accidents occurring to horses secured in the recumbent position with ropes and hopples of whatever kind. It occurs most frequently in old horses, and especially in subjects that possess sufficient vim to offer forcible resentment to the discomfort of being tied ; but it may also occur to animals of any age. Animals having inflammatory osteophytes in the various articulations, commonly the seat of lesions, are particularly susceptible, as might be also said of animals suffering from osteo-porosis. Aside from these predisposing factors, the cause of this injury is always traceable to faulty or careless management of the casting harness. The accident occurs most frequently after the horse is tied, and as the struggles are made more violent by the pain inflicted with the knife, but may also occur while the animal is but half tied, either during the tying or untying process.

In securing horses in the recumbent position, either one of two principles must be followed :

The first is to secure the legs in the *flexed position*, and the second is to fasten them in the *extended position*. The various harnesses and side-lines, such as the Cowles, Miles or Ziegler, have for their objects the securing of their limbs in the flexed position, while the English hopples and the operating tables aim to fasten them fully extended.

When using the former, the legs must be flexed firmly and securing upon the pelvis, so as to place the strong muscles entirely "out of commission." The error which leads to this accident is that allowing the legs to remain half extended, thus making a fulcrum for leverage out of the hopples and ropes by leaving the legs in a convenient position to admit a free and forcible use of the large muscles. With the operating table or English hopples, the fulcrum is transferred to such a great distance from the body as to entirely eliminate the forcibility of such a serious result as fracture of the spinal column. We have yet to have occur, or to learn of, a single accident of this character, where the restraining method respected either one of these two principles. But when they are disregarded, the accident will, I assure you, occur with uncomfortable frequency.

Fracture of the Femur is by no means an uncommon result of surgical restraint, and may occur in animals of any age. It may occur in young animals before the diaphysis and epiphysis are firmly

united; in aged animals in falling violently upon the thigh, or in the middle-aged from struggling violently with a partially released leg. In the young animals, being operated on for hernia, castration, &c., special pains must always be taken in view of this possibility. In aged horses the bedding must be made to offer ample protec tion against a possible violent fall as the patient is cast. And in the middle-aged, and in fact any horse, where a hind limb is released with the purpose of operating upon it, care must be taken to prevent the accident by giving it some liberty during forcible struggling. Accidents of this character frequently occur from fixing the released hind leg to a ring on the wall or to a post by means of a rope.

Azoturia is one of the possible accidents of surgery in the horse, because a brief period of idleness very often precedes operative treatment, and because the excitement and struggles incident to restraint are quite sufficient to provoke an attack in the susceptible subject. The prevention is simple, and too well known to mention.

Facial Paralysis.—Unilateral facial paralysis is another accident that is by no means uncommon. It is caused by permitting the subject to strike the side of the skull violently to the ground, or floor, while the operation proceeds. The injury occurs largely through the necessity of utilising untrained assistance to manage the head. Striking the head on the floor injures the seventh cranial nerve, as it passes superficially through the mastoid region towards the masseter muscle, and the immediate effect is the dropping of the under lip, and curving of the upper one to the opposite side. We have had one case of concussion of the brain from this cause that died some days later from cerebral meningitis. The mild cases of facial paralysis usually recover in from five to six weeks. Prevention consists of using a well-padded hood, deep bedding and good help.

Brachial Paralysis.—Either partial or complete paralysis of the nerves radiating from the brachial plexus may occur from casting the horse violently upon the scapulo-humeral articulation, the fall bruising the plexus between the joint and the first rib, which form its external and internal relations. This accident is either grave or trivial, according to the severity of the injury. The severe cases may never fully recover, or death may even ensue, while the milder ones make a tardy recovery. Slight radial paralysis may result on the operating table, either from violent traction upon the leg while struggling, or from lying heavily upon the shoulder on a table improperly provided with padding material. These cases, however, make a perfect recovery after two or three weeks of faulty extension of the carpus.

Injury to the Temporal-Mandibular Articulation may occur in the recumbent position from the ropes, English hopples or operating tables, and is invariably caused by improper management of the head. It is caused in the same manner as facial paralysis—by permitting the head to come in contact with the floor. This action is quite common, but always escapes notice at the time it occurs, as there is seldom any sign of injury until after two or three weeks later, at which time the patient will begin to suffer pain while masticating food, and upon examination the region of articulation will be found tender and swollen. Forcible opening of the mouth will likewise produce severe pain. The lesion usually takes the form of interarticular abscess, which will

point and discharge synovia, and eventually result in a partially anchylosed joint. The other case takes the form of a non-infective synovitis, and osteitis, but always with the same results. The patient will suffer great pain, lose flesh, suffer from periodical attacks of colic, and even die a lingering death.

Exhaustion, Collapse and Shock.—These conditions are not traceable to restraint as often as to the operation itself. Both, however, contribute to their occurrence. The pain of a prolonged operation, added to the exhaustion brought about by resisting the restraint, very frequently leaves a post-operative condition which is very alarming. The subject will usually show the first signs of the condition by refusing to return properly to the standing position when released from the confinement, and after finally being assisted to its feet, will tremble, stagger and probably show slight pain of colic. In the mild forms the condition aborts after several hours, while in others all the worse signs of shock may supervene, and threaten, if not take, the patient's life. This condition is most frequently a rope and hopple accident, and follows attempt to perform long, painful operations without an anæsthetic. By using the operating table and anæsthetics, the veterinarian should have few cases of shock from the usual grist of horse operations, and when long, painful and sanguinary procedures are attempted, they are indispensable.

Surgical shock has thus far been given very little thought by veterinary surgeons. Our literature has avoided this subject so remarkably well that one would be justified in doubting its very existence, but for the fact that it is before our eyes at every turn. Shock is observable to some extent after all operations, but is of serious import only when it threatens life. In equine operations, it is seen chiefly after the treatment of large, lacerated wounds, the ablation of large tumours, the evacuation of intestinal gas, or thoracic fluid, the return of a strangulated hernia, the reposition or amputation of an inverted uterus, and, in fact, any operation of sufficient magnitude to disturb the equilibrium of the circulation. Serious shock is the result of major operation, in which it is of much greater frequency in animals than in human operations. Our disregard for this condition is due to the dearth of major operations performed, as well as our failure to recognise shock, as such, when it occurs.

In discussing this condition, a slight distinction may be made between collapse and shock. The former is but an exhaustion of the nervous system, occurring during or immediately after the operation, while shock is seen from thirty minutes to four hours later. In the human being it is often observed as late as the third or fourth day following the operation, while animals that escape it for four hours may safely be pronounced out of that danger.

To properly appreciate shock, it is best compared with hæmorrhage, to which it is perfectly analogous, with the exception that in the former the blood remains in the vessels, while in hæmorrhage it flows out of them. Shock, appropriately defined, is but transfer of a large quantity of blood to the splanchnic vessels, that is to say, the animal is bled into the blood-vessels of the abdominal cavity, whose capacity is sufficient to contain the major portion of the entire blood volume. This phenomenon results from the starvation of the other organs and periphery and gives rise to a chain of symptoms familiar to every

veterinarian—namely, tremors, cold perspiration beginning about the head, rapid respiration, blanching or cyanosis of the mucous membranes, running down pulse and often colicky pains. The condition is best treated by the administration of ammoniacal stimulants, energetic friction of the body and legs, and finally the prompt resort to intravenous, subcutaneous and intraperitoneal injections of normal salt solution. By prompt recourse to such measures, the mortality is greatly diminished. Prevention consists in securing animals intelligently by admistering anæsthetics for operations, and of avoiding the unnecessary loss of blood.

Internal Hæmorrhage.—Rupture of blood-vessels within the cavities occasionally occurs from restraining animals. In this class we have had one case of rupture of the coronary artery, followed by death as the operation proceeded, and one case of the rupture of the anterior mesenteric artery.

The former was secured with ropes and hopples in the recumbent position and the latter in the stocks. The former groaned and strained violently throughout the operation, which was one of short duration. The latter plunged violently in the stocks while being operated on for a fistula of the withers.

Colics.—We have frequently, while still using the ropes, had horses suffering from colicky pains upon regaining the feet after a recumbent operation, and occasionally from a severe attack, one case dying, and on *post mortem* revealed a rupture of the colon. Ruptures of the small intestines have been reported to us by several veterinarians. But rupture of the stomach we have never encountered or heard of.

The Rupture or Strain of the Flexor Metatarsi occurred in two instances; one was in a pony being fired in the hock, while secured in the standing position with a single side-line. In a struggle the foot bearing the weight slipped violently backward, and upon rising, the leg hung limp in the typical attitude of this lesion. The other occurred by attempting to make a large horse rise to his feet while still partially under the influence of an anæsthetic. In the struggle, one leg slipped backward, and as in the former case hung limp as if fractured, as he finally struggled to a standing posture. These two instances are valuable as warnings of the readiness with which a very serious and unfortunate accident may occur to a valuable horse.

Fracture of the Ilium.—We have had reports of fracture of the anterior angle of the ilium, caused by falling violently upon the hip as the horse is cast, but we have reasons to believe that this accident is noted for its rarity.

Aside from the following grave injuries, one must always take into account those of the most trivial character. Injuries which in the common rift of animals would not be considered of any consequence might bring considerable anxiety to the owners of valuable animals. I refer here to bruises of the orbit, hip, stifle, shoulder, hock, knee, and to rope burns on the flexion surfaces of the legs. All of these injuries should, in justice to one's reputation, be avoided by proper protection to the parts with sufficient bedding, padded operating table, or appropriately covered hopple and rope, and by using, if possible, trained assistance.

Accidents of Anæsthesia.

We have mentioned above the necessity of using anæsthetics in certain operations in order to prevent accidents, and yet we are forced to admit that our remedy is not entirely without sin in itself. In fact, the accidents of anæsthesia are legion; yes, too numerous for comfort.

Anæsthesia in veterinary surgery belongs to the domain of surgical restraint. It is used to make our operations possible.

If our dumb subjects could be spiked to the floor, so as to perfectly immobilise any seat of operation, I doubt very much whether chloroform would ever be used in our profession. We use chloroform to protect ourselves against injury, to prevent injury to the animals, and to render possible the carrying out of certain manipulations, but seldom, if ever, to relieve pain. This condition of affairs is of no special credit to us, although it may be defended on the ground of the time and the cost to perform operations in this strictly humane manner, and on the ground of accidents liable to result therefrom.

The accidents and sequelæ of anæsthesia are :—

(1) Death from syncope and asphyxia.
(2) Bronchitis and broncho-pneumonia.
(3) Chloroform dementia.
(4) Blistering of the muzzle.

Death from Syncope and Asphyxia.—The death-rate from general anæsthetics in animals is high. While there are no satisfactory statistics obtainable, it is evident, from reports one gleans here and there, that the deaths are much more common than they should be, in view of the few animals anæsthetised. The fact that there are few expert veterinary anæsthetists accounts for the numerous deaths. Veterinarians, as a rule, have very poor confidence in themselves as administrators of anæsthetics. Is it not a fact that in anæsthetising dogs promiscuously we have an uncomfortable number of deaths, or narrow escapes of death ? How often are we brought to the necessity of applying restoratives to our anæsthetised dogs ? I have had the privilege, during the past year, to see more than 500 dogs anæsthetised with chloroform by a medical student acting as an assistant in a large laboratory without a single death, and many of these experimental animals were subjected to frightful mutilations, and kept under the influence as long as seven consecutive hours. This fact should be a valuable hint for us to practise the art in order to become proficient and thus gain confidence in our ability to administer anæsthetics without a great degree of danger. We cannot become proficient in this line by allowing anæsthesia to become more and more obsolete in our profession, as has been the case up to the present day. To prevent death from a general anæsthetic requires experience. Verbal instruction alone will not suffice. An anæsthetist must acquire a knowledge of the exact action of the anæsthetic and must become an expert in recognising that action upon the patient. He must learn to pay strict attention to the anæsthetic and give no part of that attention to the operation.

To attain the best results and kill but few animals, the veterinarian should use chloroform for the erbivora, and ether for the carnivora.

Chloroform is apparently safe for the horse and ox, but is dangerous for the dog* and cat, for reasons I am unable to explain; while ether in the horse and ox is treacherous, inactive and unreliable. Mixing anæsthetics does not help matters, but instead increases the danger. In administering chloroform to the carnivora, an alarming number of deaths will occur from asphyxia, unless the anæsthetist has had a wider experience than any veterinarian under ordinary circumstances can ever hope to attain.

The course that has given us the very best results in the horse is that of dieting the subjects for twenty-four hours, and if a fat phlegmatic patient, a course of purging, exercising and dieting, covering a period of several days, prior to the time of operation. The chloroform is then administered with a sponge, capable of holding 2 to 3 oz. of chloroform without dripping. This is held to the nostrils by means of a rubber sheet held firmly around the muzzle. The patient is made to inhale pure chloroform during three to five inspirations, and then a little air is admitted, until the surgical stage is reached. Prior to all of this, the surgical field has been prepared for the knife, so as to shorten the period of anæsthesia. And herein lies the success of horse anæsthesia. There are few equine operations that consume much time, if all the preliminary steps are already executed. For example, in a foot operation: the horse is cast, the legs secured as desired, then all of the non-painful work is carried out—that is, clipping the hair, disinfection and paring of the hoof. Now being prepared to inflict the pain, the patient is carried promptly to the surgical state of anæsthesia, as above-mentioned. The cutting is promptly executed and finished in 99 per cent. of the cases before the patient revives sufficiently to require more of the anæsthetic than was originally given. The dressing and bandaging is usually performed as the patient revives; that being completed, the subject is almost ready to regain the standing attitude, when the dressings have been adjusted. Whenever it becomes necessary to prolong the anæsthetic state the drug is given in but one nostril and in small quantities. In summarising this subject, we would suggest the following recommendations:—

(1) Prepare the patient by careful dieting, according to the condition of flesh, and of the alimentary canal.

(2) Execute all the preliminary steps of an operation before administering the anæsthetic, in view of shortening the duration of the anæsthetic state. In short, make every effort to reduce the duration of the unconsciousness.

(3) In the ordinary case administer 2 to 3 oz. chloroform with comparative rapidity, first without air, and then after three to five inspirations allow a little air to pass through one nostril.

(4) In subjects suspected of having any abnormality or condition that might provoke syncope administer the chloroform slowly and in smaller quantities.

* Although, even as recently as ten years ago, this fallacy was taught even in our Colleges, it can now be stated in all truth that British veterinary surgeons hold an entirely opposite opinion, and the most recent graduate nowadays will not hesitate to anæsthetise canine patients when necessary. Given only ordinary care and the rational, slow, administration of the vapour by a proper inhaler, and the dog becomes the best of all veterinary patients for chloroform anæsthesia. (F. Hobday.)

(5) Use the very best quality of chloroform, and always, when possible, out of the freshly-opened vial.

(6) Avoid the use of chloroform in weak and debilitated subjects, or in animals that have been under treatment with narcotic drugs, such as aconite, belladonna, opium, cocaine, &c. The same general recommendations will apply to etherisation of carnivora.

Bronchitis and Pneumonia.—Chloroform and ether in the gaseous state are quite irritating to the aerial mucous membrane, and are hence quite liable to provoke serious inflammatory condition of the air passages. A slight cough is always observed after operations performed under anæsthesia, but especially after a prolonged state of anæsthesia. Chloroform pneumonia is not as common in animals as in man, largely because of the shorter duration of the operations, and possibly on account of the greater resisting powers offered by animals against pneumonia. It is seen in animals that have been kept under the influence too long, in debilitated subjects and in those exposed to infectious diseases of the air passages (shipping fever, &c.), and is comparatively rare where common sense dominates administration.

Chloroform Dementia occurs, as in the two foregoing accidents, from prolonged use of the anæsthetics. It is observed immediately after the operation. The subject, instead of promptly reviving from the narcosis, becomes delirious, will fight with the limbs, and, if made to rise, will push the head to the wall, and act much as an animal suffering from staggers. The milder cases recover after several hours, while severe cases, owing to the condition being aggravated with more or less shock, will succumb. The condition never follows brief anæsthesia.

Blistering the Muzzle.—Chloroform will irritate the integument of the lips and nostrils sufficiently to warrant the use of a preventive measure, which is found in the simple precaution of anointing the muzzle in vaseline prior to the application of the sponge.

With these few commonplace remarks about restraint and anæsthesia, which in veterinary surgery belong to the same category, the general section of our subject will conclude with a brief reference to the great accident of "microbian infection" of surgical wounds.

Microbian Infection.

Blood poisoning, suppuration, and a few of the specific infections occur with remarkable frequency after veterinary surgical operations. In fact, few operations escape this accident, which, owing to the frequency, might better be designated as a universal incident. The soiled condition of everything around a veterinary surgical operation is a dominating cause that cannot often be entirely eliminated.

Among the accidents, or rather sequelæ, of this character we have had follow our operations are:

(1) Infective inflammation leading to suppuration.

(2) Infective inflammation leading to acute septicæmia or pyæmia.

(3) Infective inflammation leading to extensive necrosis of the surrounding tissues.

(4) Infective inflammation extending into vital structures, *i.e.*, the peritoneum, synovial apparatus, &c.
(5) Tetanus.
(6) Malignant œdema.
(7) Glanders.

Infective Inflammation leading to Suppuration. — The suppurating process is such a common sequel of surgical operations upon animals that it is ordinarily taken as a matter of course. Veterinarians are not very often surprised when their wounds discharge a purulent secretion. They expect it. The exception is found in a few clinics, where exceptional efforts are made to prevent it. I am referring here to the usual operation performed in the routine of the most veterinary surgeon's work. The prevention requires the inauguration of such tedious measures, and its occurrence is usually regarded as such a trivial affair, that very few veterinarians use their best efforts in that connection.

The graver infections enumerated as Nos. 2, 3 and 4, which are caused by the same infection as simple suppuration, but which are less frequent because of the great resistance of the domestic animals against them, on account of their infrequency do not alarm the veterinarians to the same extent as the human surgeon.

In a city practice, however, where large numbers of operations are performed on animals in all conditions of health and vitality, these grave afflictions command considerable respect. It is not unusual to have deaths follow such operations as trephining the skull, operations upon fistulæ of the withers, poll-evils, quitters, shoe boils, shoulder tumours, &c., because grave septic infections have transgressed into the surrounding structures, and have created fatal systemic disorders.

To lessen a number of these sequelæ is an absolute and momentous necessity. Suppuration, unless extensive, is ordinarily harmless, so far as destroying life is concerned, and, in fact, actually acts as a defence against graver developments of a given infection; but when the same organisms which cause it are very virulent, or find a fruitful field from the lowered vitality of the tissues just operated upon, or from the low vitality of a debilitated subject, there is always danger of provoking the grave microbian diseases. It is, therefore, evident that there are reasons to use preventive measures against infective inflammations in all veterinary operations. But what constitutes an infective measure in preventing microbian invasion into our surgical wound? Aseptic work? No! Aseptic work has been tried in veterinary practice, and has been found wanting. Practical experience in this direction directs us to advocate antiseptic work. The liberal, and, of course, intelligent use of antiseptics of high potency offers the only solution of this problem. While it behoves us to be scientific in the interest of the nicety of our craft, we must also be practical enough to apply methods which will fill the bill, from all standpoints, including the cost, speed, and the results.

Let us see what can be done in the direction of overcoming the terribly soiled condition of the environment, the patient, the surgeon's hands, and the surgical instruments.

Given an operation, say upon a shoe boil, in a veterinary hospital

of ordinary cleanliness, or, if you choose, in a livery stable or farm barn. To make matters as bad as possible, let us suppose that the shoe boil has been lanced, and is discharging pus. Such a subject will furnish the most intricate surgical problem confronting the veterinary practitioner who aims to respect intelligent *technique*, and, if successfully mastered, the solution of the problem should apply to the treatment of any of our surgical wounds.

We should first learn to cope with:

The Air, in which we are forced to operate. On the farm, out of doors, in a grass plot, the best surroundings are found. If indoors, the place must not be dusty. Shaking up a straw bed just before operating is not an exemplification of sound surgical knowledge, although it is one of our most common errors. In the hospital or stable of any type the operating-room can be made free from dust in a few moments by sprinkling the floor and air with some cheap antiseptic, like creolin. Whatever method is used, the surgeon must not neglect the principle involved, and that is, that the air of city stables, and straw or hay dust, such as would be used for a bed in the country, are bearers of dangerous microbian infections.

The Surgical Instruments.—The second item to be considered is that of disinfecting instruments. In the hospital where a heating apparatus is at hand, boiling is not an impractical method, but the most sensible and rapid method of dealing with them is to immerse them in a 5 per cent. solution of carbolic acid for a few moments. A salt-mouth jar protected at the bottom with some soft material, like rubber, cork, or cotton, to prevent dulling the edged instruments, is the most convenient. Instruments may be kept in a jar as the patient is being secured and otherwise prepared for the operation, and just before using them they are taken from the jar with a forceps and placed into the instrument tray, or upon a clean towel. This mode of disinfection is practical and effectual.

The Hands.—The third item is the hands of the surgeon. The veterinary surgeon's hands are always dirty. None of us have surgically clean hands at any time, especially if we are handling the dirty ropes and the dirty patient just a moment before the surgical wound is made. Systematic disinfection of the hands is both impossible and impractical. Impossible because they are always putrid, and the time is too short to clean them, and impractical because valuable time would be lost if an attempt is made to do so. The solution of this problem is found in avoiding digital manipulations. Keep your dirty hands out of your surgical wounds, is a mighty pertinent command, homely as it sounds. We must learn the appropriate use of the dissecting forceps, the tissue forceps, the wound retractor, the tenaculum, the needle-holder, &c., and thereby dispense with the digital manipulation.

It is seldom necessary to touch a surgical wound with the hands.

The Patient.—Next comes the patient, which, by this time, has been properly secured. I say properly secured because the prevention of microbian infection depends largely upon having the seat of operation under good control. Flying particles are thus prevented from falling into the wound, and the technique can be more hurriedly executed.

The seat of operation is then washed, clipped and shaved, and the

surrounding parts are moistened with water to prevent loosened hairs from constantly falling into the wound. The surgical field itself is then washed with a strong antiseptic solution. For this purpose the solution should be powerful. A 1 per cent. solution of mercuric chloride is none too strong. In such a strength it is effectual and still harmless.

The Operation.—The dissection of the tumour proceeds with the assistance of retractors, hooks and forceps, without touching the parts with the hands. The sponging is done with an antiseptic solution, but care is taken to keep any antiseptic liquids from coming into contact with the wound edges. These edges, when brought together, must heal by primary union, and if sponged with an antiseptic of even nominal strength will lose its regenerating vitality and unite poorly, if at all. Never sponge the edges of a surgical wound with an antiseptic when prompt union is expected.

The putrid area of the shoe boil—that is the walls of the abscess—will be all dissected out, except possibly the anterior wall. This may be sterilised with very strong antiseptic, the hot iron may even be used. We often use the hot iron here for the double purpose of arresting the hæmorrhage and destroying the micro-organism of the abscess wall, but at no time should the wound edges be molested. Their vitality must be preserved. The edges are then brought together with appropriate sutures, using the needle holders and forceps.

The patient is then returned to the standing position, and the sutures covered with some form of plastic dressing. Such a wound will again become infected on its inner aspects, but not until the edges have safely united.

This case is related here to illustrate a brief method of preventing microbian infection in a practical manner on veterinary subjects operated upon in unclean surroundings, where aseptic work would be impossible. There are many details of some importance that might be properly mentioned here, if space would admit, but these are left to the surgeon's ingenuity.

Specific Infections.

Accidental infection with specific organisms is of somewhat rare occurrence in veterinary surgery. Our wounds are not endangered to any considerable extent with tubercular bacilli and anthrax; black quarter, malignant œdema and glanders are rare sequelæ of surgical wounds. Tetanus, however, occasionally follows our surgical operations. Docking the tail, castration and puncture firing, are the special operations most likely to be followed by this affliction. The prevention, in addition to the usual fight against microbian infection, consists of the free exposure of the wound and the use of tetanus antitoxin. In castrations the tetanus bacillus is carried into the depth of the inguinal canal with the soiled ecraseur chain, emasculator or clamps. In docking they come from the infective stable floor, finding a favourable soil beneath the eschar. In the puncture-firing operations they are carried beneath the skin, which structure they inhabit, by the hot iron; the eschar forming a suitable place for propagation.

In addition to these operations tetanus may follow accidental wounds surgically treated. It is therefore advisable in practice to take careful steps looking to its prevention, when there is some danger of its occurrence; that is, in the districts where it is prevalent, in the treatment of the kind of wounds that are liable to cause the disease, and especially in the treatment of wounds of valuable animals.

A second specific infection we have observed on two occasions is that of malignant œdema. In each instance it followed surgical incisions about the withers. One case followed a severe operation for fistula of the withers that was carried out with ordinary care as to surgical cleanliness. The second case followed a simple operation upon a saddle sore.

Malignant œdema, like tetanus, is due to a microörganism of the anærobic variety—the *Bacillus œdematis maligni*—which is quite widely disseminated in dusty places and must, as a consequence, be taken into account in veterinary operations performed indoors. The disease follows accidental wounds, or operations that admit organisms into the subcutaneous areolar tissue. Wounds about the shoulders, elbows, or withers seem to give the greatest number of cases.

The disease is very fatal, and unless discovered early will rapidly develop beyond control. It is recognised by a very painful œdematous and emphysematous swelling appearing at the seat of infection, in addition to a marked systemic derangement from the very beginning. Its course is a short one. Death occurs in from twenty-four to forty-eight hours after the appearance of the first symptoms. When the disease is recognised early, its progress can be controlled by free incision of the skin over and around the swelling, so as to admit air freely into the surrounding tissue not yet invaded. Free injections of hydrogen peroxide is also effectual as additional treatment. At best the favourable cases make a very slow and tardy recovery, covering several weeks.

The Bursting Open of Suture Wounds.

Is there any accident, sequel or incident in surgery any more provoking than the breaking open of the suture wound?

This accident is about as frequent as the wound itself. That is to say, almost all sutured wounds in large patients break open instead of uniting. An old practitioner once told me that he had no recollection of any suture wound ever uniting in his practice, covering a period of more than a quarter of a century. He sutured all wounds requiring such treatment, but always provided his clients with directions for the open wound treatment that would surely be necessary in from three to six days on account of the inevitable parting of the sutured edges. Is this not practically the experience of all veterinarians? We suture wounds only to see them break open after a few days. The only exception is wounds on the forehead, acnestis, or croup, where the parts are in the perfect state of repose that is essential to prompt skin union.

The causes of the difficulty in this connection are:—

(1) *The Friction* between the approximated edges caused by the patient's movements. Wounds located upon the limbs or over the large muscles are not easily immobilised, and therefore do not permit the formation of the new uniting tissue necessary to prevent parting of the edges.

(2) *Pyrogenic Infection* may also contribute to the bursting of stitches. Although an infective wound may unite fairly well, it usually follows the usual course of bursting open in a few days.

(3) *Tension of the Stitches*, which press upon the tissues and cause stitch necrosis, and, of course, opening of the wound therefrom.

These three causes—that is, motion, infection and stitch necrosis—work hand in hand in many of our wounds; not practically all of them. They present a problem that is difficult to solve. We must first attempt to cope with the first obstacle—motion—by suturing the wounds and managing our patients in such a manner as to prevent motion between the edges of wounds. Keeping the patient in a single position for a few days or immobilising a joint or limb by bandages, will always materially assist in accomplishing the purpose. This, of course, must never be omitted, although that precaution alone will never be sufficient. It is also necessary to arrange the suture to the best advantage. In most wounds two separate sets of sutures are necessary. One set, of the *mattress* or *button* variety, should be adjusted some distance from the edges of the wound with the intention of creating an immobile area within them. The second set unite the edges themselves. They should be so inserted as to bring the raw surface of the skin together, and never in-fold the skin, as stitches are very apt to do. This set of stitches must be of very fine thread, inserted with a fine needle, and must never be taut. They may then be applied very close to each other without harm.

This method prevents stitch necrosis and motion to the highest possible degree. Infection is prevented by cleanliness, antisepsis and drainage. When stitching an unshaved skin, or one that is none too clean, it is good practice to pass the needle from within outward, so as not to carry infective matter upon or within the skin into the depths of the wound. This method necessitates frequent threading of the needle, but it is worth while, in view of the better results obtained. Another item which materially lessens the danger of infecting wounds or sutures is that of threading as many needles as will be required to close a given wound. Each needle should be made to hold enough thread for one stitch, and neither it or the thread when once placed upon the needle should again be touched with the fingers, and all suturing should be done with the needle holder and forceps.

Clinical Articles.

FRACTURE OF THE HUMERUS IN A MULE FROM MUSCULAR CONTRACTION.

BY D. AITCHISON, M.R.C.V.S., CIVIL VETERINARY SURGEON, A.V.D., PRETORIA, SOUTH AFRICA.

THE subject was an aged North American gelding mule, of the Army Service Corps, that had been imported into South Africa at the beginning of the war, and had worked up to date without any record of lameness. On September 11 he was doing his usual work as off-wheeler in a team of six at a trot, the waggon being empty. The road was down hill, and, although a good one for South Africa, would be designated worse than bad if judged by an English standard. The animal was noticed to stumble and immediately become dead lame on the off fore. He was taken out of harness and led back to the stable close at hand on three legs.

When I saw him I at once diagnosed a fracture of the off humerus, and had him destroyed. On *post-mortem* examination a diagonal fracture, extending through the entire length of the shaft from one end to the other, was discovered, but there was but little displacement. The tissue of the bone was perfectly healthy and the animal in good condition, so that the only way I can account for the accident is by the sudden violent contraction of the muscles when he recovered himself after stumbling.

Accidents of this nature make one reflect on the rarity of dislocation of the scapulo-humeral articulation in equines compared with man. In this case the humerus was fractured before luxation could take place.

PERINEAL HERNIA IN THE DOG.

BY GEOFFREY LIVESEY, M.R.C.V.S., HOVE.

RATHER more than a year ago a smooth-coated Irish terrier about 10 years old was brought to me suffering from rectal impaction. The rectum was enormously distended, and the fæcal collection was only removed after some considerable time and trouble had been expended. Since then there had been a swelling, which, though at first inconsiderable, had steadily increased in size until it attained very large proportions. During the year he had twice been attended for rectal impaction. After the last attendance, as the rectum seemed so distended and the anus inclined to gape, he was ordered a cold-water enema every morning. On August 1 this year the rectum once more became impacted (the enemas having been discontinued), and he was sent to me. The fæces were removed, but the swelling was not diminished thereby, but appeared larger, and semi-fluid fæces were passed involuntarily. The swelling was on the right side of the tail and anus, and from its position and size pushed the anus over to the left, giving the dog a curious appearance, which was

emphasised by all the hair having been worn from the surface of the enlargement. The skin of the tumour was easily compressible with the fingers, and felt like the inflated walls of a cavity, or as if the rectum was ballooned beneath the skin. I thought there was a partial paralysis of the rectum, and feared a hernia, but I could not decide as to what the sac contained. The finger in the rectum gave no help. The prostate was enlarged and rather painful, but nothing resembling bowel could be felt, nor was the tumour "doughy." The swelling was only slightly influenced by the position of the dog, and could never be made to disappear entirely. I decided to operate, find the cause of the dilatation, and overcome it by strong sutures.

On August 8 the dog was prepared by emptying the rectum, shaving the surrounding hair and washing and disinfecting the skin. He was put under chloroform, and the swelling incised over its greatest part. Bleeding was arrested with adrenalin (takamine), and the edges of the wound separated and held widely apart with retractors. A cavity was exposed, out of which rapidly escaped a large piece of omentum. I now knew I had to deal with a perineal hernia. The rectum was not ballooned, but quite normal, and did not obscure the operation site to the slightest degree. The omentum was replaced and kept in the abdomen with a sterile swab while I prepared to put in some deep stitches. This part of the operation proved more difficult than one would imagine, as there is not much inside the pelvis of a dog that allows of a good stitch being inserted. I avoided touching the rectum for fear of penetrating it, and so infecting not only my wound but the abdominal cavity also. Several of the larger blood-vessels and nerves pass over the brim and inner walls of the pelvis, and I naturally did not wish to injure any of these, besides which on the floor the urethra passes, and the prostate and bladder are just beyond the brim.

The skin and fascia forming the roof, however, offered a good hold. I managed to get four good deep stitches inserted between the roof and floor, thus obliterating the previous cavity without doing any damage and without interfering with the rectum. A strip of skin was snipped from the edge of the outer wound and a row of closely placed interrupted sutures of silkworm gut inserted, the surface washed with perchloride, dried, and covered with the preparation "new skin" over cyanide gauze. During the afternoon and evening all the periproctal region was very swollen, and the dog seemed to suffer a fair amount of discomfort; all solid food was withheld for forty-eight hours, fluids only being allowed.

On the 9th the wound remained healthy and the dog fairly comfortable, but the swelling was still rather profuse, and there was some discolouration of the surrounding skin. The rectal temperature was 103·6°. On the 10th the dog was less comfortable; temperature 103·8°; the swelling was more discoloured and fluctuating, so I removed two stitches and withdrew about 1½ ounces of sanious fluid. Weak chinosol solution was injected to the wound and also into the rectum, where a small quantity was retained. From this date onward the wound gradually closed up, healing proceeding very slowly; every day a small amount of sanious pus was discharged, and on one occasion one of the deep (silk) sutures came away when the wound was syringed; after this healing was more rapid, and the

dog's condition improved. I do not consider this case to have been very successful as there is still (six weeks after operating) a little distortion, the anus being turned rather to the left side. The dog seems to have aged, and has lost all his old agility and keenness. His appetite is variable, but his bowels act regularly, and his motions are of normal appearance. It is possible that there may be a small rectal fistula, which would account in a great measure for the change in the dog, but I did not find any such condition before the patient left hospital. There has been no recurrence of the hernia.

Since operating on this dog, another case has come under my notice, but unfortunately I was not allowed to operate, as the owner wished the animal to be destroyed. In this case (a large collie) the hernial swelling entirely surrounded the anus; the latter was swollen and sore, probably from the dog dragging himself along the ground. The hernia was easily reduced by pressure, but immediately returned when pressure was removed. It had been noticed for only about three weeks, and had been diagnosed by another veterinary surgeon as "piles," purgative pills having been prescribed. These aggravated the dog's condition by causing him to strain. The animal had only twice been known to have been constipated. The rupture may best be described as a large fluctuating swelling, easily reducible by pressure; in its depths could easily be felt the tuberosities of the two ischial bones, and, in the centre, the anus and rectum, giving the impression of a species of core. Whether the hernial contents were bowel or omentum I was unable to decide, but I presumed they consisted of portions of the small intestine. The dog was destroyed, and I was unable to make a *post mortem*.

PARALYSIS OF THE TAIL.

BY HENRY B. EVE, M.R.C.V.S., FOLKESTONE.

SUBJECT.—A milking cow, aged three years.

HISTORY.—On my arrival at the farm the owners informed me that the cow had been turned out along with the others in a grass field where building operations were taking place, and had fallen into a pit during the night. The cowman and others had pulled her out.

SYMPTOMS.—She now appeared very dull and depressed, her appetite had completely gone, the pulse and respiration were accelerated, and she had a straggling gait when made to move over in the byre.

Upon examination of the spine, she gave evidence of pain in the region of the loins, and was totally unable to raise her tail.

The bowels were constipated and the abdomen tympanitic, rumination was suspended, and there was no milk to be obtained.

TREATMENT.—A sheepskin was applied to the loins for twenty-four hours, and a stimulating liniment applied twice a day to the spinal column; the urine was drawn off with a catheter, and a dose of Epsom salts and treacle was given internally to commence with. Subsequent treatment consisted of internal administration of stimulants, combined with nerve-tonics. The animal was convalescent in nine days.

FRACTURE OF THE BASE OF THE SKULL.

BY LIEUT. NICHOLAS, A.V.D., BANGALORE, INDIA.

On the evening of July 15 I was requested to see a horse belonging to the Carabineers, which had met with an accident and was bleeding profusely from both nostrils. On my arrival, half an hour after the accident had taken place, I found the patient down and utterly exhausted. There was hæmorrhage from both nostrils and from the ear of the near side. The horse had lost an enormous quantity of blood and was sweating profusely; the extremities were cold and the pulse imperceptible, the conjunctival mucous membrane pale, and the mouth held partly open. Death took place some twenty minutes later, and a *post-mortem* examination revealed fracture and displacement of the basi-occipital and post-sphenoid bones, also fracture of the process of the occipital bone of the off side.

There was, as might have been expected, a large clot of blood in this region, and, on enquiring the cause of the accident, I was informed that, as one of the soldiers was about to mount, the horse suddenly reared and fell backwards, dropping heavily on the top of the skull.

FRACTURE OF BOTH FEMORA IN A COLT.

BY W. D. BLANCHARD, M.R.C.V.S., LEOMINSTER.

On June 21 last I was asked to see a well-developed two-year-old cart colt. The animal was at grass, and had been observed by the owner to be lame in the morning. There had been a severe thunderstorm during the previous night, and it was supposed that that had something to do with the lameness.

The owner drove the animal to the farm, nearly a mile distant, and stated that it had walked fairly well when once it had started. Upon examination, I found pronounced lamness on the off hind leg; the stifle was abducted, and there was more freedom of movement upon manipulation than is usually present. The owner thought that the stifle was out, and at first I, too, thought that this joint was the seat of injury, but upon further examination I detected a clicking or knocking noise. This could be plainly demonstrated by holding the stifle-joint in one hand, and, secondly, giving the femur an upward thrust. There was no crepitation, no apparent displacement, and, at first, no swelling.

Treatment.—As the region of the hip-joint was very painful, the parts were fomented with hot water, and dressed with anodyne liniments. This was followed by a blister. As matters did not improve, and the colt rapidly lost flesh, I gave an unfavourable prognosis, and one day, about the end of July, the animal got down and was unable to get up again. I advised that he should be shot, but the owner would not consent until September 15.

The horse was put in slings, but did not take to them very well, and a few days before his death he fell out of them, and appeared to have received another injury.

Post-mortem examination disclosed a fracture of the head of each femur, one being much more recent than the other. The lesion and its surfaces were polished like ivory, and a good deal of periostitis had been present, causing deposition of bone on the adjoining portion of the shaft.

A SEVERE ACCIDENT AND SUBSEQUENT DEATH.

BY R. LEWIS GREEN, M.R.C.V.S., DUDLEY.

THE patient, a colt, seven years old, bolted whilst being driven down the street and turned into a *cul-de-sac*, at the bottom of which was a very strong turn-stile with four arms, each 2 ft. 4 in. long, square in shape, tapering from 3½ in. to 6 in., and iron shod. One arm, which faced the animal's approach, penetrated the chest between the right limb and sternum, fracturing the fourth, fifth, and sixth ribs, bruising the right lung, and eventually passing through the diaphragm, which it ruptured to the extent of about a foot. The right half of the liver was also damaged, and the large colon was punctured in two places. Two feet of intestine followed the withdrawal of the arm of the turn-stile, and passed into the thoracic cavity.

This happened at 5 o'clock p.m., and the horse died suddenly on the following day at three p.m., apparently from internal hæmorrhage. The point of interest was that the animal should have lived so long (nearly twenty-four hours), after having received such violent shock and injury.

HYDRO-THORAX—OPERATION AND RECOVERY.

BY R. LEWIS GREEN, M.R.C.V.S., DUDLEY.

THE patient, an Irish terrier dog, 5 years old, was brought into our infirmary on February 24 last, the owner stating that the animal had no appetite and appeared to be breathing more heavily than usual. The dog had been unwell for a week, and on the previous day, when following the trap, he became so exhausted that the owner was compelled to pick him up. Upon examination, I found the visible mucous membrane to be congested, the pulse fast and thready, the coat staring, respiration 60 and very short. Upon auscultation I could detect evidence of pleurisy, but I was unable to definitely locate the presence of fluid. The patient was wrapped up in a jacket of Gamgee tissue, and was placed in an even temperature, being fed with Plasmon and various meat extracts. Medicinal stimulants in the form of a mixture of tincture of cinchona, ammonia, and heroin were administered. On the 26th there was great disinclination to move and entire loss of appetite, and the dog was perceptibly uncomfortable when lying stretched out. On the 27th the patient was worse, and the legs had become swollen. Being sure now that there was fluid on the chest, I advised an operation. Paracentesis-thoracis was performed in a standing position, and, on withdrawing the trocar, a stream of light straw-coloured serous fluid followed; in all, one pint eighteen ounces was taken away. The wound was covered with sal antisepticus (Huxley), the Gamgee jacket was replaced, and for the next few days a mixture of iron and quinine varied with potassium iodide was given. The relief experienced was at once evident, as within a very short time the dog ate a good meal of meat and slept comfortably. The progress after this was uneventful, the dog being carefully looked after to see that he did not get wet or catch cold. The Gamgee jacket was removed on March 14. I have had the patient under close observation ever since, and at the present time (October) he remains in apparently perfect health; in fact, on September 10 he followed a trap to Birmingham and back (twenty miles) without apparent distress.

AMPUTATION OF THE UTERUS IN A COW.

BY T. FOULKES, M.R.C.V.S., BROMYARD.

I was called about eleven o'clock one evening to see a Hereford cow, which was said to have a womb protruding. Upon arrival I found the whole of the uterus out, and evidence that some one had been trying to effect reduction and in doing so had ruptured the wall, passing one or both hands completely through. I was quite convinced that the only plan to save the life of the cow was to perform amputation. This was done by the light of a candle in the following crude way: a strip of calico, three inches wide and about a yard long, was passed around the wound, as close to the tail as possible; giving one end to a man, I took the other, and in this way we made a ligature, performing the traction slowly and steadily. I then passed a sacking needle, which we borrowed from the farmer, and threaded with a broad piece of tape, dipped in carbolised oil, through the centre of the neck of the uterus, just behind the calico ligature. The tape was cut near the eye of the needle, and the two ends were ligatured on either side; the womb below this was then cut off, the whole being smeared with carbolic oil, and the stump returned and held *in situ*. The portion removed filled the bottom of an ordinary wheel-barrow, as the cow had only calved some six or eight hours before. She suckled her calf for a week, when the latter was taken away, the vagina was syringed with permanganate of potash solution for about ten days, but otherwise the case gave no trouble, and, to my satisfaction, the cow made an excellent recovery, being afterwards sold, fat, for nineteen guineas.

COMPARISON BETWEEN THE TRANSMISSION OF AN INFECTIVE GRANULOMA OF THE DOG AND CARCINOMA OF THE MOUSE.*

The sequence of changes by which tumours arise in mice after transplantation of carcinoma, has been shown to consist essentially in a continued growth of cells derived in the first instance from a sporadic tumour. Considerable difference of opinion has arisen as to the relation which this mode of transmission bears to the infective processes, and it is therefore useful to compare with it the minute details of the changes by which tumour-like masses of new growth are produced when transplantation is effected with the tissue of a true infective granuloma.

For this purpose an infective venereal tumour common in the dog, which is normally transmitted by coitus, affords unequalled facilities. We are indebted to Mr. Goodall, F.R.C.V.S., and Mr. F. Hobday, F.R.C.V.S., for the material on which these investigations have been conducted, and for the history of infection in the animals from which the material was obtained. When transplanted into the subcutaneous tissue it gives rise with great constancy to enormous tumour-like masses of uniform histological structure.

* Abstract from the Report of the Imperial Cancer Research Fund. Part II. 1905.

PLATE IX.

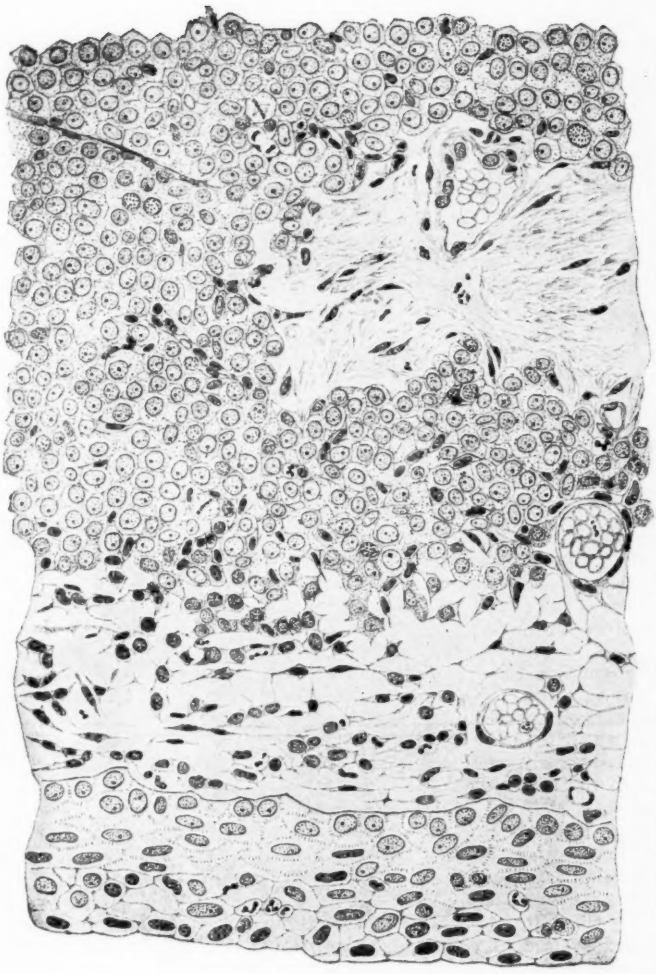

FIG. 23.—Infective venereal tumour of vagina of dog. Primary growth in vagina. Transformation of connective-tissue corpuscles into tumour cells. × $\frac{420}{1}$.

Fig. 23, Plate IX., shows the histological characters of such a growth occurring naturally in the vagina of a fox terrier. The stratified squamous epithelium rests on a fibro-cellular connective tissue separating the epithelium from the tumour mass. The latter consists of polygonal cells with scanty granular protoplasm and large spherical nuclei. In the resting condition these cells possess one large nucleolus and a delicate chromatin reticulum. Two centrosomes lying near together can generally be demonstrated close to the nucleus. Mitotic division is common in these nuclei, and, although the type is normally bipolar, multipolar figures are not unusual. Delicate connective-tissue septa with fully developed capillaries divide the cellular mass into irregular lobules. Bundles of connective tissue and unstriped muscle may be caught up into the growth, without, however, showing any evidence of pressure or degeneration. Hæmorrhage is frequently found, and blood-corpuscles may come to lie between the large cells. The general appearance closely resembles a round-celled sarcoma, with the parenchyma arranged in alveoli, in which the cells have taken on a polygonal form from mutual pressure.

Where the tumour adjoins the surrounding connective tissue, certain features may be observed which militate against the view that this growth is in reality a true sarcoma. If growth has not been rapid enough to produce marked pressure on the surrounding areolar tissue, a gradual alteration of the character of the connective-tissue corpuscles is apparent, *vide* fig. 22, Plate IX.). While at first they are elongated and flattened plates with a densely staining nucleus, a gradual transition occurs as one passes from the unaltered connective tissue to the fully-developed tumour, the protoplasm at first becoming more voluminous, and later the nucleus increases in size and stains more faintly. Although additions to the tumour mass occur in this manner, the increase in size of these growths is mainly due to the active division of cells, which already possess the characters described above. Therefore the growth increases in its later stages almost entirely from its own resources, and in this respect closely resembles a true malignant new growth. The features of a true sarcoma are illustrated in fig. 24, Plate IX. In this case—a round-celled sarcoma in the subcutaneous tissue of the leg of a dog—the essential elements of the growth are readily recognised since they contain metachromatic granules like those of the "mast cells" of connective tissue. At the surface of the growth it is impossible to determine in many cases whether a cell belongs to the growth or to the normal connective tissue. There is no evidence, however, of an increase in the "mast cells" or other connective-tissue elements, but of a progressive infiltration of the tumour cells along the lymph-channels of the connective tissue.

To elucidate the nature of the vaginal growth it is necessary to study the changes which take place when transplantation is effected and new tumours result. When this is done and successive stages are followed, it is found that the establishment of a new tumour is accomplished by a transformation of the connective-tissue cells at the site of inoculation into elements indistinguishable from those of the primary growth. The tumour cells introduced degenerate very rapidly, a few only retaining their vitality for a period of not more than three or four days. This sequence of changes is illustrated in

PLATE IX.

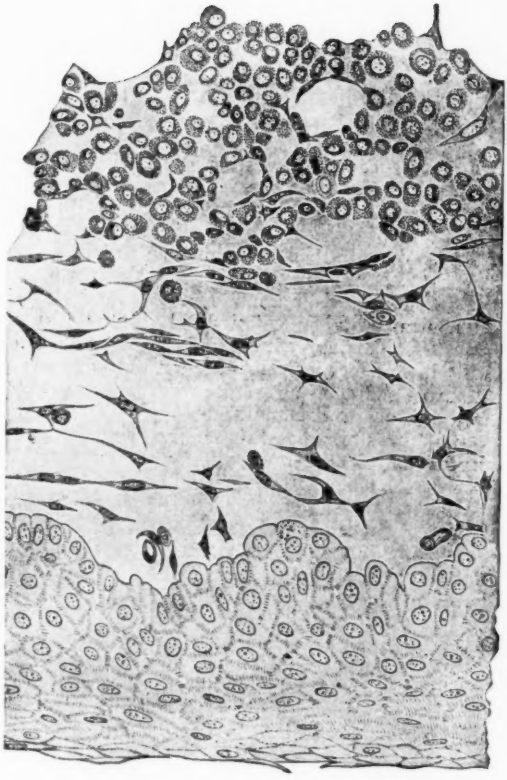

FIG. 24.—Round-celled sarcoma (mast cells) of dog. Growing surface of primary tumour beneath skin. Shows absence of transformation of surrounding tissue. $\times \frac{420}{1}$.

fig. 25, Plate X., 48 hours after inoculation, and in fig. 26, Plate X., after four days. In the latter only the broad zone of reaction is shown and illustrates clearly the proliferation of the otherwise unaltered connective-tissue corpuscles, and their gradual transformation and enlargement into characteristic tumour cells multiplying rapidly by bipolar and multipolar mitosis.

Inoculation can also be effected through scarifications of the conjunctival and vaginal mucous membranes, and of the delicate skin of the penis. The disease thus produced can be transmitted by coitus to the other sex. Whether the transmission be effected in this manner or by transplantation of larger portions of tissue, palpable tumours can be recognised in 8-10 days, and these may subsequently attain a diameter of several inches. The disease cannot be transmitted to the cat, rabbit, guinea-pig, rat, or mouse. In the dog transmission is nearly always successful, and succeeds with all the different breeds of dog which we have used. A small proportion of the growths produced experimentally, after attaining a certain size, diminish in volume, and ultimately disappear. Such recovery has not been followed by an immunity to subsequent inoculation, and animals with large tumours have been successfully reinoculated. A micro-organism has not been cultivated from the natural or experimental tumours, nor have we been able to recognise any organisms in sections, or in film preparations, of the growths. Numerous nodules may develop in the mesentery after intra-scrotal inoculation. Lymphatic glands adjacent to large growths may be enlarged. A diffuse enlargement of the testis occurs naturally in the dog, in which the normal structure is replaced by cells of the same character as are seen in these growths; these two conditions may be allied to one another.*

This growth therefore presents many similarities to a true malignant neoplasm. The characters in which it resembles malignant new growths are its histological features, local mode of origin, partial growth from its own resources, in later stages causing pressure on surrounding tissues and organs, the apparent absence of an immunity after successful inoculation, natural or experimental, and the limitation of transmission to one species.

In sharp contrast with malignant new growths are:—

(1) Its invariably infective history.† Whenever the disease occurs naturally in animals under careful observation, coitus can be proved to have taken place with an animal suffering from the disease. The ease with which experimental transmission takes place is in marked contrast to the complete failure which has attended attempts to transmit carcinoma and sarcoma from dog to dog.

(2) The transformation of the surrounding connective-tissue corpuscles into tumour cells even at the surface of fully developed tumours.

(3) The processes which occur in artificial transmission are identical with those by which tumour masses are formed as a result of inoculation with the tubercle or glanders bacillus. The subsequent

* Duplay and Cazin have recorded the occurrence of this condition in the testis after inoculation on the penis (*loc. cit.*).

† English veterinary surgeons have long recognised its highly infective character.

PLATE X.

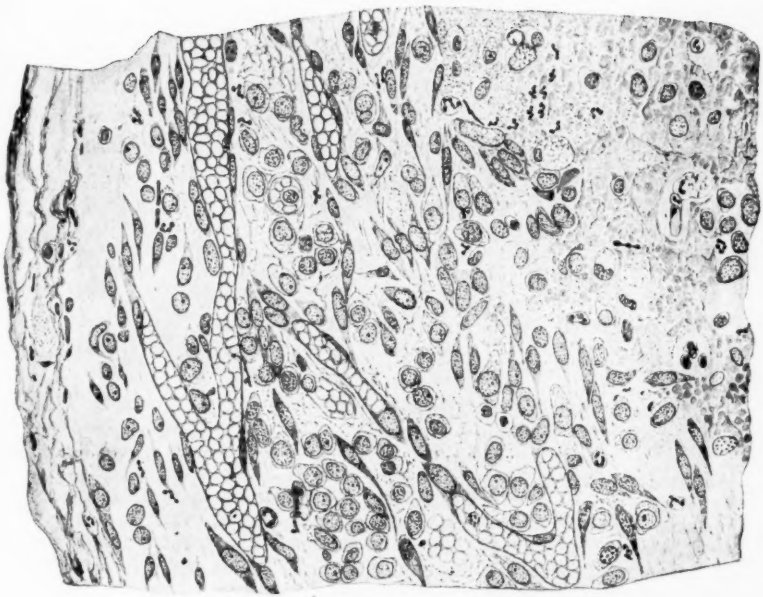

FIG. 25.—Infective venereal tumour of dog. Site of transplantation after forty-eight hours. Degeneration of introduced tissue and proliferation of new capillaries. $\times \frac{400}{1}$.

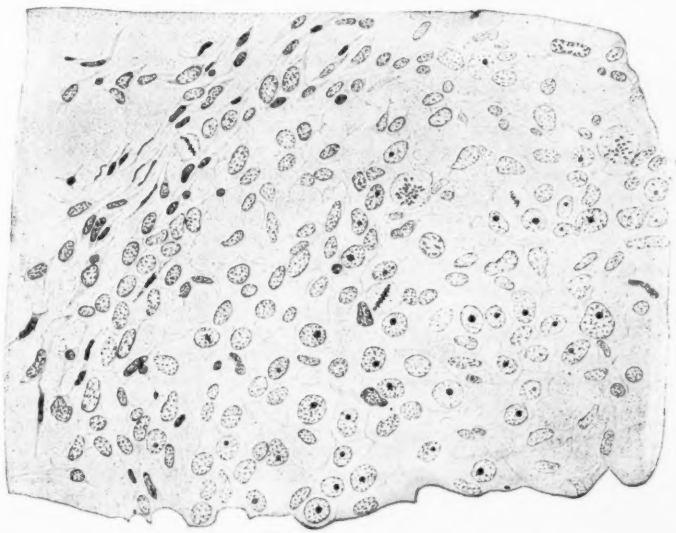

FIG. 26.—Infective venereal tumour of dog. Site of transplantation after four days. Transformation of connective-tissue corpuscles into tumour cells and mitoses. $\times \frac{400}{1}$.

proliferation of the cells in the infected area is, however, much greater in the dog tumour than in these ordinary infective granulomata.

(4) The disease never occurs naturally in animals before sexual maturity, and is much less frequent in old age. All the seventeen cases which have come under our observation have been in young adult animals, and the majority in animals kept for breeding purposes.

From a consideration of all these characters it follows that these tumours of the vagina and penis of the dog are connective-tissue reactions to a living virus which has not yet been demonstrated.

The study of the processes following inoculation demonstrates clearly the means by which experimental transmission takes place. The process is definitely infective, in marked contrast to the changes which lead to the establishment of new tumours when a true malignant new growth is successfully transplanted. There is every reason to believe that infection occurs in the absence of any injury to the mucous membranes.

We have discussed the characters of this tumour and its behaviour under experiment in some detail, because it has been made the object of extensive experimental study by several investigators, who have regarded it as belonging to the sarcomata or even carcinomata. We have seen growths of similar character in other species, and it is probable that tumours of this nature are frequent in animals. Should they be made the object of experimental study, the results will almost certainly be interpreted as transmission of a malignant new growth, if the study of the changes following inoculation is omitted, as has hitherto been the case in this particular disease in the dog.

The first experimental study of this condition is that of Wehr,* who published an account of his experience in 1888-89. He regarded it as a *carcinoma*. Geissler† published further investigations in 1895, and Duplay and Cazin in 1900‡. Geissler regarded it as a *carcinoma*; Duplay and Cazin recognised its infective nature, and described its structure as inflammatory rather than carcinomatous; they transmitted it by transplanting tumour tissue. In 1897§ Bellingham-Smith and Washbourne published an exhaustive account of their experiments. They described and figured the histological appearance, and also the naked-eye characters of the disease as it occurs naturally on the penis and in the vagina. They recognised its very infective nature and its transmission during coitus. They described it as identical histologically with *round-celled sarcoma*, without, however, stating that it was a true malignant new growth. Dr. Rose Bradford has assured us of the identity of the tumours in our experiments with those studied by Smith and Washbourne, for whom he performed the inoculations. More recently a genital tumour of dogs has been studied experimentally by Sticker‖, who describes the naked-eye appearances of the growths which arise after transplantation into the subcutaneous tissue,

* Deutscher chirurgischer Congress, 1888-89; *Arch. für klin. Chirurg.* 339, 1889, p. 226.

† Verhandlungen der deutschen Gesellschaft für Chirurgie, 1895.

‡ *Trans. of Eleventh Internat. Med. Congress, Rome*, vol., ii., 1894.

§ "Infective venereal tumours in Dogs." *Trans. of the Path. Soc. of London*, 1897, vol. xlviii.

‖ "Transplantables Lympho-sarkom des Hundes." *Zeitschrift fur Krebsforschung*, Bd. i., 1904, p. 413; and *Medizinische Klinik*, 1905.

the peritoneum, and nearly all the different organs of the body. He regards it as *a lympho-sarcoma*, and has recorded no history of natural infection in the case of the sporadic tumour which has served as the starting-point of his transplantations. San Felice* has also propagated this tumour experimentally, and states that he has isolated a blastomyces, which he regards as the pathogenic organism of the disease. This interpretation is certainly erroneous. Cell-inclusions are absent in the cells and we can confirm the observations of Plimmer,† who was unable to demonstrate cell-inclusions like those described by him in mammary carcinoma of the human subject.

ABSTRACT FROM THE REPORT OF THE PUBLIC CONTROL COMMITTEE OF THE LONDON COUNTY COUNCIL (1904-05).

Diseases of Animals, Acts 1894-1903.

These Acts have for their object the suppression of contagious diseases among animals, and the prevention of cruelty to animals during transit. The Acts are supplemented by orders issued by the Board of Agriculture and Fisheries dealing with infectious diseases in animals, disease-infected areas, and with precautionary measures to be adopted to prevent the spread of disease.

The Council is the local authority for administering the Acts in London—except as regards foreign animals—and, in accordance with statutory authority, has appointed the Public Control Committee the Executive Committee for enforcing the Acts. The outdoor staff consists of eleven veterinary inspectors, and two officers who superintend the conveyance, slaughter, and destruction of diseased animals at knackers' premises. The veterinary inspectors are all qualified veterinary surgeons in private practice, and are remunerated by fees.

The reported cases of contagious diseases among animals in London, during the past year, were as follows:—

Anthrax.—Four horses, all of which died.

Glanders.—1,718 horses, of which 1,654 were slaughtered by order of the Council, 23 by order of the owners, and 41 died whilst suffering from the disease. Compensation amounting to £5,418 7s. 6d. was awarded in respect of 1,623 animals.

Swine Fever.—Three outbreaks; 11 swine were killed by order of the Board of Agriculture, as diseased, or as having been exposed to infection.

Epizootic Lymphangitis.—126 horses, all of which were slaughtered by order of the owners.

For the purposes of comparison, the amount of contagious disease in animals that occurred in London during the past year and the ten preceding years is shown in the subjoined table.

Glanders.

This equine disease, which is also communicable to man, is dealt with under the Glanders or Farcy Order of 1894, which requires owners, or persons in charge of diseased animals, to notify the fact.

* "Sulla inocubilità dei tumori maligni." *Riforma medica*, 1904.

† *Practitioner*, vol. 62, April, 1899.

Disease.	Number of animals attacked by disease										
	1894-5	1895-6	1896-7	1897-8	1898-9	1899-1900	1900-1	1901-2	1902-3	1903-4	1904-5
Glanders, including farcy	981	965	857	955	832	1,066	1,486	1,857	1,572	2,055	1,718
Typhoid in swine	37	76	73	22	23	7	36	41	22	5	11
Pleuro-pneumonia ..	2	—	11	11	—	—	—	—	—	—	—
Sheep-scab	98	—	—	—	—	—	322	—	—	—	—
Anthrax	2	—	—	—	—	2	1	2	3	3	4
Rabies	12	46	61	1	1	—	—	—	—	—	—
*Epizootic Lymphangitis	—	—	—	13	—	—	—	—	—	—	126

* This disease was only scheduled in 1904.

The order gives permissive power to local authorities to order the slaughter of diseased animals, subject to the payment of a minimum compensation of £2, and a maximum of quarter value. Suspected horses may also, with the consent of the owner, be slaughtered subject to the same rates of compensation if found to be diseased. Full value is required to be paid in respect of any animal slaughtered under the order which is found not affected with glanders.

The order also enables local authorities to make regulations as to (*a*) the movement and marking of diseased or suspected animals; (*b*) the movement of animals which have been in contact with diseased or suspected animals; (*c*) the removal of manure, fodder, litter, &c.; (*d*) the removal and disposal of carcases; and (*e*) cleansing and disinfection.

The Council has made regulations dealing with these subjects; and those controlling the movement of in-contact animals would be very valuable in suppressing the disease if they were not rendered largely nugatory by a proviso that they shall only operate so long as a diseased horse remains in the stable, &c., or until the regulations as to cleansing have been complied with.

The veterinary inspectors are instructed to take all the measures in their power to free their districts from glanders, to keep all suspected stables, and all stables in which disease had existed within fifty-six days, under observation; to visit such stables fortnightly, and carefully examine the horses therein, and especially those that may have been in contact with diseased horses.

When a horse, giving no outward indications of glanders, is suspected, whether because it has been working with or standing near to glandered horses, or for any other reason, the inspector is authorised to advise the owner to cause the horse to be properly injected with mallein, and to adopt the precautions set out under the head "Injection of Mallein" on a paper issued by the Council. The employment of mallein injections for purposes of diagnosis of glanders rests entirely upon the advice and responsibility of the veterinary inspector.

During the past year, 1,718 cases of glanders in London have come to the knowledge of the inspectors, and of these 471, or about 27 per cent., were diagonised solely by the use of mallein. In these cases the maximum compensation allowed by the order has been awarded. Mallein has also aided diagnosis in 375 cases with suspicious symptoms, but the minimum compensation provided by the order, £2 only, has been awarded in respect of the slaughter of these animals.

The number of animals attacked with the disease during the year shows a slight diminution on the figures for the previous year as

regards London; but reference to the subjoined table will show that a marked increase has again occurred in the adjoining counties.

Year	London	Middlesex	Essex	Kent	Surrey	Great Britain	Percentage of London's proportion
1885	786	43	15	11	12	946	83
1886	933	30	16	6	11	1,114	83¾
1887	1,282	50	12	10	11	1,482	86
1888	1,307	50	21	16	13	1,581	82¾
1889	1,952	66	23	15	12	2.246	86
1890	1,563	58	20	7	17	1,808	86
1891	2,174	81	22	10	24	2,435	89
1892	2,526	107	40	16	33	3,001	84
1893	1,619	89	35	21	40	2,133	76
1894	982	60	36	16	12	1,437	68
1895	1,036	109	81	18	23	1,594	65
1896	857	52	49	21	27	1,294	66
1897	980	73	57	24	20	1,629	60
1898	845	94	49	8	9	1,385	61
1899	905	77	62	12	20	1,472	61½
1900	1,387	75	96	39	22	1,858	74½
1901	1,828	93	119	54	17	2,370	77
1902	1,604	58	85	36	39	2,073	77
1903	1,915	118	102	18	52	2,499	76½
1904	1,869	123	132	26	77	2,658	70
	27,350	1,506	1,172	384	491	37,015	

Although the decrease in the number of London outbreaks, and the reduction of London's proportion of the whole of the cases in Great Britain to 70 per cent. are satisfactory, it is still very unsatisfactory to see that the annual total has nearly doubled since 1894, when the present glanders order came into operation. The returns for Great Britain during 1904 are higher than for any year since 1892.

The statistics as to glanders indicate that the disease is practically confined to large towns, where facilities for contact are greatest; nearly 90 per cent. of the total number of outbreaks were reported from London and the Home Counties, London being the great centre of the disease.

It is obvious that the present law is inadequate to suppress the disease. The Council has long been of this opinion, and has made several representations to the Board of Agriculture on the subject. As a result of these, a Departmental Committee was appointed in 1899 by Mr. Long, which issued a report containing recommendations for enabling local authorities to more successfully cope with the disease. The Council has repeatedly urged the Board to give effect to these recommendations, and the Public Control Committee has attended as a deputation before two succeeding presidents of the Board to urge the same thing; but no fresh regulations have yet been issued.

The chief defects of the present order are the permissive character of the majority of its requirements, the lack of power to deal with in-contact animals, and the failure to give official recognition to the mallein test. The discovery of this diagnostic test has practically revolutionised the method of dealing with glanders. Prior to its discovery, it was only possible to detect the disease by outward symptoms, whereas many horses in a stable might have been infected

without exhibiting any symptoms. By the aid of mallein an owner can tell with great certainty which animals are latently diseased, and, if these are slaughtered, the spread of the disease is at once arrested.

The present law, however, does not prevent the disposal of apparently healthy animals from an infected stud, and the sale of affected animals by unscrupulous horse owners is one of the most fruitful means of spreading the disease.

To indicate the extent to which mallein is voluntarily employed in the diagnosis of glanders in London, it may be mentioned that during the past five years, out of a total of 8,688 cases, 1,716, or about 18 per cent., have been slaughtered solely on account of reaction to the mallein test. In only four of these cases has the *post-mortem* examination failed to reveal lesions of glanders. Ten cases with external symptoms have also been slaughtered during this period, in which no evidence of the disease was found on autopsy. Mallein has also been employed to assist in the diagnosis of 1,815 cases where the clinical symptoms were indefinite.

The amendments in the glanders order which the Council consider essential are :—

(*a*) Compulsory notification of the disease by veterinary surgeons.

(*b*) The legal recognition of a reaction to mallein as diagnostic of glanders.

(*c*) Power to deal with in-contact horses.

The Board of Agriculture have under consideration the question of issuing an amending order, which there is every reason to believe will be issued in the near future.

During the year, thirty-four infringements of the order have been reported, and penalties amounting to £150 14s. have been imposed in the twelve cases in which legal proceedings ensued. In the remaining cases, owing to the outward symptoms of disease being slight, the owners have been cautioned.

Rabies.

Another year has passed without a single case of rabies having occurred in the county, which has now enjoyed immunity from the disease since 1898. As a result of its extermination, hydrophobia has also ceased to exist. Prior to 1898, this dread disease was, for a period of upwards of twenty years, responsible for the death of, on an average, twenty persons annually in Great Britain.

Under regulations as to the control of dogs, made by the Council in 1897, and still in operation, about 20,000 stray dogs are annually destroyed in the metropolis. The table following shows the number of dogs seized by the police under the Council's regulations, and the manner of their disposal.

Under the Rabies Order of 1897, every diseased or suspected dog, or a dog which has been bitten by a diseased or suspected dog, is required to be compulsorily slaughtered. In all such cases a *post-mortem* examination is made by one of the Council's veterinary inspectors; and in cases of doubt, or where a person or animal has been bitten by a suspicious animal, further investigations are conducted at the Royal Veterinary College or the Brown Anima Institution. During the year twenty-six *post-mortems* have been made in these cases, in four of which further experiments were conducted, but in every case with a negative result.

Period.	Number of dogs seized by the Police	Number of dogs claimed at Police Stations and Dogs' Home	Number of dogs destroyed or disposed of	Number of cases in which proceedings have been taken.
October 27, 1899, to March 29, 1900 ...	6,899	941	5,985	727
March 30, 1900, to March 28, 1901 ...	16,982	2,095	14,877	2,267
March 29, 1901, to March 31, 1902 ...	21,568	2,847	19,081	2,831
April 1, 1902, to March 31, 1903 ...	23,346	2,511	20,835	2,852
April 1, 1903, to March 31, 1904 ...	23,947	2,448	21,499	2,345
April 1, 1904, to March 31, 1905 ...	24,020	1,949	22,071	1,655
Totals	116,762	12,431	104,331	12,677

Anthrax.

Four horses have died from this disease during the year; but, although these cases occurred in four separate studs, owing to the prompt isolation of the carcases and thorough disinfection employed, the outbreaks did not spread.

The carcase of a cow which had died suddenly was sent to a London knacker's yard from Surrey, and after a portion of the carcase had been utilised for trade purposes, notice was received from a Surrey inspector that death was due to anthrax. The Council was, however, able to seize and destroy the hide.

In view of the prevalence and increase of anthrax in the country the Board of Agriculture issued a notice cautioning stock owners against cutting the carcases of animals found to have died suddenly, until it has been determined that death was not due to anthrax. Copies of this notice have been exhibited at the request of the Council at all the Metropolitan Police stations.

Epizootic Lymphangitis.

This contagious disease, affecting horses, has recently been introduced into this country, but is at present mainly confined to military stables. In order to prevent the spread of the disease, the Board of Agriculture issued an order in April, 1904, prescribing notice to be given of any outbreak. The duties of the Council in connection with London cases are briefly:—

(*a*) To satisfy itself, on receipt of notice, that the disease does in fact exist.

(*b*) To cause the isolation of every affected animal.

(*c*) To see that all places in which diseased horses have been kept and all appliances used in connection therewith are satisfactorily cleansed and disinfected; and

(*d*) To cause the carcase of every diseased horse to be destroyed.

To ensure as wide a notice as possible being given of the order, large and small placards were prepared setting out its principal requirements, the symptoms of, and the precautions to be taken against, the disease; the larger placards were exhibited at police stations and the smaller ones were distributed among London horse owners.

During the year notice has been received of 126 horses having been affected with the disease. All of these, with two exceptions, were army horses which had been brought back to this country at the

conclusion of the late Boer War. Horses under the charge of the Army Veterinary Department, or in any veterinary college, are exempted from the provisions of the order; but the duty is cast upon the local authority of destroying the carcases of diseased animals from these institutions and defraying the cost of such destruction. The Council has been called upon, therefore, to destroy the carcases of 124 military horses, which service has cost £248.

In the remaining two cases, which occurred in civilian stables, one horse was a recent importation and probably had become affected abroad. Owing to the owner ordering slaughter as soon as the disease was diagnosed, and to the effective cleansing operations carried out (including the destruction of all articles used in connection with the animal), the disease did not spread in the stable. The remaining case was that of a cab horse found at a London knacker's yard; but although rigorous enquiries were made, the source of infection could not be detected.

ARMY STATIONS AT WHICH EPIZOOTIC LYMPHANGITIS OCCURRED FROM SEPTEMBER 26, 1902, TO JULY 31, 1905.

ENGLAND.

Stations	Admissions	Cured	Destroyed	Remaining	Remarks
Aldershot	67	10	57		
Birmingham ...	3	1	2		
Bradford	25	2	23		
Brighton	3	...	3		
Bulford	3	...	3		
Chatham	4	3	1		
Chelsea	3	...	3		
Christchurch ...	3	...	3		
Colchester	3	...	3		
Deepcut	1	...	1		
Dorchester ...	13	...	13		
Dover	1	...	1		
Hounslow	1	...	1		
Ipswich	17	1	15	1	Cured—under observation
Leeds	1	...	1		
Longmoor	5	...	5		
Manchester ...	4	...	4		
Newcastle-on-Tyne	21	14	7		
Pirbright Camp ...	1	...	1		
St. John's Wood	1	...	1		
Sandhurst	1	...	1		
Sheffield	2	...	2		
Shoeburyness ...	2	1	1		
Shorncliffe... ...	6	...	6		
Trawsfynydd ...	1	...	1		
Windmill Hill ...	1	...	1		
Woolwich	301	67	222	12	7 cured—still under observation; 5 in Plumstead Marshes, isolated
York	1	...	1		
	495	99	383	13	

ARMY STATIONS AT WHICH EPIZOOTIC LYMPHANGITIS OCCURRED FROM SEPTEMBER 26, 1902, TO JULY 31, 1905.—*Continued.*

IRELAND.

Stations	Admissions	Cured	Destroyed	Remaining	Remark
Ballinrobe	1	...	1		
Bandon	2	...	2		
Clogheen	6	...	6		
Curragh	6	...	6		
Fermoy	1	...	1		
Glen Imaal ...	4	...	4		
Kilkenny	5	...	5		
Limerick	1	...	1		
Newbridge ...	1	...	1		
Waterford	10	2	8		
	37	2	35		

SCOTLAND

Station	Admissions	Cured	Destroyed	Remaining	Remarks
Glasgow	1	...	1		

RECAPITULATION.

Stations	Admissions	Cured	Destroyed	Remaining	Remarks
England	495	99	383	13	See remarks above
Ireland	37	2	35	...	
Scotland	1	...	1	...	
	533	101	419	13	

SUMMARY OF RETURNS OF THE DEPARTMENT OF AGRICULTURE FOR IRELAND.

Period		Anthrax		Epizootic Lymphangitis		Foot and Mouth Disease		Glanders (Including Farcy)		Pleuro-Pneumonia			Rabies		Sheep Scab	Swine Fever	
											Cattle Slaughtered		Cases Reported				
		Outbreaks	Animals Attacked	Outbreaks	Animals Attacked	Outbreaks	Animals Attacked	Outbreaks	Animals Attacked	Outbreaks	Diseased	Exposed to Infection	Dogs	Other Animals	Outbreaks	Outbreaks	Swine slaughtered as Diseased or exposed to Infection
Week ended September 30th, 1905 ...		—	—	—	—	—	—	—	—	—	—	—	—	—	1	2	9
Corresponding week in	1904	—	—		—	—	—	—	—	—	—	—	—	—	—	5	125
	1903	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	58
	1902	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	57
Total for 39 weeks, 1905		3	3	10	25	—	—	17	55	—	—	—	—	—	238	45	1,363
Corresponding period in	1904	3	3	1	1	—	—	9	30	—	—	—	—	—	378	175	3,707
	1903	2	3	—	—	—	—	2	3	—	—	—	2	—	408	145	3,137
	1902	—	—	—	—	—	—	8	35	—	—	—	—	—	449	147	2,920

NOTE.—The figures for the current year are approximate only.

ON THE VIRULENCE OF *BACILLUS MALLEI* OBTAINED FROM HUMAN SOURCES.*

BY WILLIAM BULLOCH, M.D. (EXAMINER IN PATHOLOGY TO THE ROYAL COLLEGE OF VETERINARY SURGEONS), AND F. W. TWORT, LONDON.

GLANDERS in man is generally believed to be uncommon, although no doubt this belief is partially due to the protean characters which the disease manifests clinically, and which renders it difficult of diagnosis. Years ago Virchow (1) wrote: "Es geschieht, datz Leute mit dieser Affektion lange Zeit behandelt werden, ohne datz man von der gefährlichen Natur ihrer Krankheit eine Ahnung hat." During the years that the bacteriological recognition of *Bacillus mallei* has been rendered possible cases have been recorded with ever-increasing frequence. In the majority recourse has been had to the inoculation of the male guinea-pig, in which, as was pointed out especially by Straus, a well-marked orchitis develops. The inoculation material has been either the bacillus isolated from the glanders lesions, or the pus and exudate from these lesions directly, as the finding of the bacillus in the exudate is often associated with difficulty. In regard to the development of the testicular disease in the guinea-pig, reports are fairly uniform. Without mentioning the question of dosage required, Straus (2) says that after intraperitoneal inoculation the swelling of the testicle is very apparent in two to three days. "Au 8e ou 10e jour elle a acquis des proportions très considérable, l'animal succombe beaucoup plus rapidement, en général au bout de douze à quinze jours, parfois en quatre à huit jours." Nocard et Leclainche (3) express themselves in exactly similar strain: "L'animal succombe généralement en 12-15 jours, parfois en 4-8 jours."

Prettner (4), without mentioning the animal source of the culture, states that 1 g. of a bouillon culture (obtained from an agar culture of the first generation) causes orchitis within twenty-four hours, the swelling reaching its maximum in three days after the inoculation, and the guinea-pigs never survive till the eighth day, the majority dying on the fifth or sixth day.

Zieler (5), who experimented with the pus of two human cases of glanders, obtained at first inconstant results as far as concerned the production of a typical "Straus reaction," but with pure cultures the result was unequivocal, and, even after prolonged antiseptic treatment of the glanders lesions, no attenuation of the virulence of the bacillus could be observed. With cultures from his second case—the dose used is not stated—he obtained typical orchitis in twenty-four hours, and death in three to six days.

During the last three years we have examined six cases of glanders at the London Hospital, two being acute in course and four chronic. In each case the diagnosis was made by bacteriological examination, the typical exudate of the tunica vaginalis being obtained from the injection of pure cultures isolated from the glanders lesions. In each case we have been struck by the rapidly fatal disease induced in the guinea-pig. The animals used weighed from 400-700 g., death occurring on the third day. From the first culture obtained from each human case one loopful was suspended in bouillon and injected

* Translated from the *Centralblatt . Bakteriologie, Parasitenkunde u. Infektionskrankheiten.*

intraperitoneally. The loop contained about 1 mg. The original cultures were obtained from the human cases on surfaces of potato, and, as soon as the appearance of the yellowish colony suggested *B. mallei*, a minute loopful was obtained by touching the colony, and this was the material injected. The remaining part of the colony was used for the microscopic examination (staining, &c.).

Within twenty-four to thirty-six hours the testicles were found to be profoundly swollen, red, and apparently tender, the swelling increasing up till death, which, as stated above, occurred in all the cases within three days. The *post-mortem* examination revealed an extensive typical glanders exudate in the tunica vaginalis and an exudate in the peritoneum. From the testicular lesion, as well as from the peritoneum, typical *B. mallei* existed in pure culture. From the frequence with which we have obtained this rapid effect, it has occurred to us that the bacillus is probably much more virulent from human than from equine sources. We subjoin a very short summary of the actual cases, and do not propose to deal with glanders in man *in extenso*, as that has been recently done very completely by Zieler (*loc. cit.*).

Acute Glanders.

Case 1.—H. B., 51, tram-conductor. Ill three weeks. Illness began with shivering and fever. Pustules appeared on arms, legs, and forehead, erythematous rash. High temperature throughout the disease. Death two days after admission into the hospital.

Post mortem.—Farcy nodules in skin, acute glanders nodules diffused throughout the lung. Primary source of infection not determined.

From a pustule on arm during life *B. mallei* isolated on potato. From first culture one loopful inoculated into male guinea-pig. Typical Straus reaction in twenty-four hours. Death on third day.

Case 2.—G. B., carman, illness about three weeks, admitted with pyrexia and multiple abscesses.

Pus from abscesses contained bacilli like *B. mallei*, inoculation on potato, save a pure growth of *B. mallei*. One loopful inoculated into guinea-pig, severe orchitis by the forty-eighth hour. Death on third day.

Chronic Cases.

Case 3.—A. F. Abscesses of thigh lasting for months. From pus *B. mallei* obtained in pure culture. One loopful from first potato culture killed guinea-pig with typical glanders in forty-eight hours.

Case 4.—A. D., aged 31. Occupation warehouseman. Admitted suffering from chronic pyæmia, multiple abscesses all over body. Bacillus isolated from an abscess on the arm. Inoculation gave positive result, and death of the guinea-pig on third day.

Case 5.—F. R., aged 23, carman. History of illness of ten months began after attending a horse suffering from "inflammation of the lungs." Illness began with abscess on inner side of right foot. Four months later abscess of testicle, which burst through the scrotum. Large abscess of left thigh. On admission a large raised infiltrated area on left side of face extending from inner canthus to left ala nasi.

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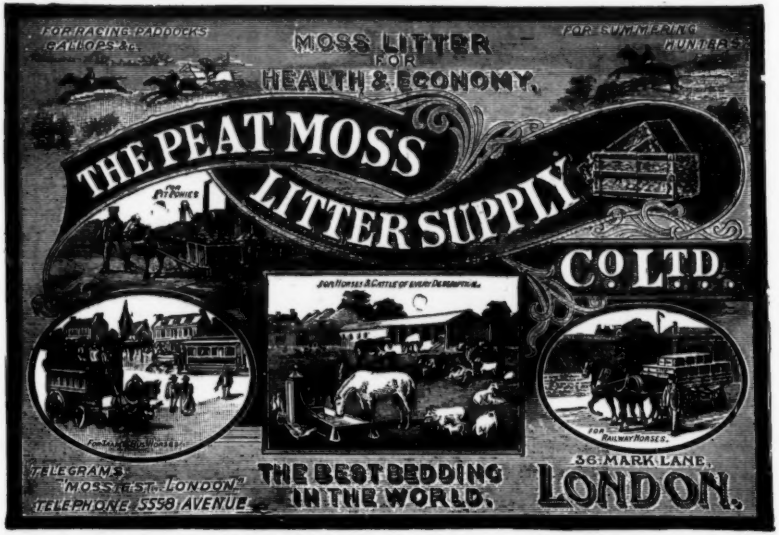

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A sinus existed at the lower end. Sinus scraped out, and the mixture of pus and blood subjected to examination. *B. mallei* isolated, one loopful injected into guinea-pig. Death with typical appearances on the third day. Testicle severely affected.

Case 6.—No information could be obtained about this case except that it was one of chronic pyæmia in a man whose occupation was a carman. The pus from one of the abscesses was sent for examination. Pure culture of *B. mallei* isolated. Inoculation of first culture obtained killed a large male guinea-pig in three days with a dose of one loopful.

We add a seventh case, although the exact nature of the disease is doubtful, and it possibly comes into the category of pseudo-glanders. It was that of a woman suffering from an abscess, the character of the pus of which led to the bacteriological examination for *Bacillus mallei*. On potato a culture was obtained of what appeared to be typical *Bacillus mallei*. It was a non-motile, Gram negative rod giving greyish colonies on agar and yellowish moist colonies on potato, ultimately turning to the typical chocolate brown said to be characteristic of *Bacillus mallei*. Seven different inoculations were performed on male guinea-pigs. Four of these were entirely negative. In the other three a rapidly fatal infection was produced, death occurring in twenty-four hours. No glanders lesions were found, although the bacillus, which was present in large quantities, presented, like the primary culture, all the typical appearances, morphologically and culturally, of the *Bacillus mallei*.

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VETERINARY TOXICOLOGY.

BY LIEUT.-COLONEL NUNN, F.R.C.V.S., F.R.S.E., C.I.E., D.S.O., BARRISTER-AT-LAW, AND FORMERLY DIRECTOR-GENERAL ARMY VETERINARY DEPARTMENT.

(*Concluded from p.* 257.)

Tares.

Tares, which comprise a variety of plants belonging to the natural order *Graminacæ*, genus *Lolium*, such as the *L. perenne* and *L. italicum*, which are harmless, and others, *L. temulentum* or *enivrante* and *L. linicola*, which are poisonous. Only the seeds of the *L. enivrante* are toxic, and they frequently get mixed up with other forage. The seeds are enveloped in two glumes, the lower one of which is furnished with a long pointed awn, and which distinguishes it from the *L. perenne*. (Cornevin, *Traite des plantes veneneuses.*)

The starch grains are small, 4 to 8 μ, whereas those of rye are 25 to 45 μ, and more globular, but they turn blue equally readily with iodine.

According to MM. Baillet and Filhol, the poisonous properties of the *L. enivrante* are due to two substances, one a yellow-coloured one, which is found in the oil that is extracted by ether from the starch, and the other is contained in the flower and extracted in a watery solution after treatment with ether.

In the human being 30 grammes is a poisonous dose. Cornevin gives the quantity per kilogramme of live weight as 7 grammes for the horse and 18 for the dog, cattle and poultry appear to be immune. (Clabaud and Baillet.)

Symptoms.—At first there is dulness, depression, and muscular tremors that become more and more violent, and develop into tetanic spasms of different groups of muscles. The animal lies down, the membranes are infected, and the respirations and circulation quickened. The first are laboured and painful, the pulse small and thready, and the temperature falls. This stage is followed by one of paralysis and coma that ends in death, which in the dog is preceded by convulsions.

A case is mentioned by Cornevin where death took place thirty hours after eating two kilogrammes of tare seeds.

Post mortem.—The lesions consist of congestion of the nerve centres, stomach and intestines, the blood is of a dark, black colour.

Treatment usually is useless, emetics should be given with stimulants, such as coffee, alcohol and ammonia.

Cantharides.

The Cantharides or Spanish Fly belongs to the order *Coleoptera* and the family *Trachelides.* They are of a metallic green colour, and are found in most parts of Southern Europe. They are collected during May and June, and as they were originally imported from Spain their vernacular name of Spanish Fly arose. They have powerful blistering properties, and a strong, penetrating, disagreeable smell. The active principal is cantharidine, a substance in the form of small mica-like flakes, colourless, odourless, and with an acrid, irritant taste. It is volatile, insoluble in water, but slightly soluble in alcohol and ether, and freely so in chloroform. The ordinary powdered cantharides contains about 4 per cent. cantharidine. The flies may be accidently eaten by animals browsing on the trees; also the use of the fly in a blistering ointment may give rise to poisoning, but when taken by the mouth it causes violent inflammation.

The active principle is easily absorbed into the circulation, whereas the cantharidine particularly shows its effects on the urino-genital system, being eliminated by the kidneys and causing violent acute nephritis. Cantharidine also acts on the nervous system, first causing excitement, followed by depression, coma and death.

Toxic doses.—

Horse and ox	20 to 30 grammes.	
Sheep	5	,,
Dog	0·50 to 2	,,
Rabbit	0·05	,,

According to Dragendorff fowls, turkeys and frogs are refractory, but he mentions the case of a cat being poisoned from eating a fowl that had been fed on cantharides and in whose flesh a quantity of cantharidine had been detected.

Symptoms.—When the poison has been taken by the mouth there is violent gastro-enteritis, complicated with stomatitis and acute pharyngitis, salivation, dysphagia, nausea, vomiting, colic, tenesmus and blood-stained diarrhœa. The general effects of the poison are seen very early, there is dysuria, the quantity voided being scanty, blood-stained and albuminous, with painful erection in the male and abortion in the pregnant female. Usually there is great sexual excitement and injection of the generative organs, quickening of the respirations and circulation and elevation of the temperature. Later on there is coma, the animal is depressed, respiration is difficult and laboured, the temperature falls, cold sweats break out, and the animal dies from failure of respiration. In some cases death is preceded by general convulsions.

If poisoning takes place from absorption the urino-genital symptoms are the most marked.

Treatment.—Symptoms must be treated, mucilage and opium being given to overcome the gastro-enteritis and nephritis; oils should be avoided, as they dissolve the cantharidine.

Post-mortem appearances.—When taken by the mouth there is intense gastro enteritis, which may be superficial and diffused or deep and circumscribed, and there are almost invariably patches of ecchymosis, vesicles and ulcers. In certain cases there is irritation of the mouth, pharynx and œsophagus. There is almost invariably parenchymatous inflammation of the kidney, and the mucous membrane of the bladder and ureters are also involved.

Chemical analysis.—Vomited matter and the contents of the stomach and intestines may contain portions of the fly, which are easily recognised. An analysis which, according to Dragendorff, can be made three months after death, can be carried out on the vomited matter, contents of the intestines and stomach, excrement, urine, liver, and kidneys.

Dragendorff recommends the following method. To the suspected material is added an 8 per cent. solution of caustic potash and boiled till it forms a clear, homogeneous fluid. It is then treated with chloroform to remove foreign matters, and to the residue four or five times its volume of alcohol and a small quantity of sulphuric acid is added. The whole is again boiled and filtered while hot, allowed to cool, and again filtered. The alcohol is driven off by distillation and the residue again treated with chloroform, which is evaporated, and what remains will be a strong vesicant. The crystals of cantharidine are insoluble in water and alcohol, but soluble in chloroform, potash, and soda.

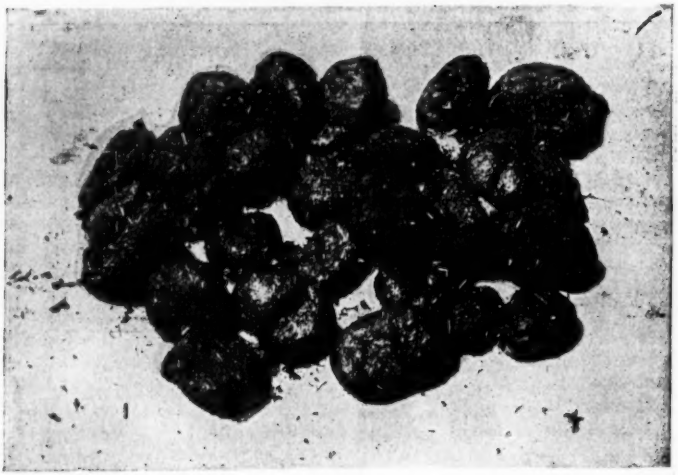
A solution in soda, when evaporated and treated with water, gives a red precipitate with salts of cobalt; white with acetate of potash, and yellow with chloride of palladium.

The vesicant action of the residue can be tested on the ear of a rabbit or dog, or one's own forearm.

Ergot of Rye (Ergotism).

Ergot is a diseased condition of grain caused by a mould (*Claviceps*

THE UNIQUE CLAIMS OF MOLASSINE MEAL PROVED.



Photograph of Manure from "IRENE" after feeding with Molassine Meal.

This photograph shows manure some weeks after "Irene" had been fed on Molassine Meal, and after it had lain sufficient time for germination to take place in case there had been any undigested grain pass through. It is quite free of any cereals and is perfectly healthy and inodorous, showing that Molassine Meal has had its usual effect upon the stomach and digestive organs, and had brought the animal to a perfectly healthy condition, **and able, as we claim, to obtain the full amount of nutriment of his entire food,** to the financial benefit of the owner.

Another mistake buyers sometimes make is that they attempt to compare the value of Molassine Meal with cake or other food. Our answer invariably is, that you cannot compare Molassine Meal with any other food, as there is no comparison. **It is not only its actual feeding value, but the tremendous additional value it gives to all other foods, in consequence of its antiseptic and digestive properties.**

Horse-owners and stock-feeders can test this feature for themselves, when they will have the same results.

PRICE: £6 15s. per ton, or 7s. 6d. per cwt. at Works, LONDON or LIVERPOOL.

BEWARE of other foods with similar names, which are only IMITATIONS.

Manufactured by

HENRY TATE & SONS, Ltd., Sugar Refiners, LONDON and LIVERPOOL,

UNDER LETTERS PATENT EXCLUSIVELY FOR

THE MOLASSINE CO., Ltd.,

36, MARK LANE, LONDON, E.C.

Altered and Damaged Food.

Poisoning can take place from ordinary food which has undergone certain alterations, generally due either to moulds or micro-organisms which elaborate certain poisonous principles.

The common moulds that cause alteration in the food are :—

(1) *Rust*, due to the *Puccinia graminis*, which forms lines of yellow, red, or black spots on the leaves and stalks of plants.

(2) *Smut*, caused by the *Ustilaginea*, of which there are several sorts : *ustilago carbo* of barley, wheat, oats ; *ustilago maydis* of maize ; and *tilletia caries*, that causes *bunt* in wheat. The affected grains have a smell of herrings, which is communicated to the flour.

(3) *Moulds* attack many sorts of food, but chiefly those that have an acid reaction, and are various, viz., *penicillium glaucum* of mouldy bread ; *aspergillus glaucus* of fruit, and which grows on walls and pieces of wood, in the form of greenish-yellow tufts ; *aspergillus niger*, of a dark brown ; *aspergillus fumigatus*, of a bluish-grey : *aspergillus flavus*, &c., and the *Rhysopus nigricans* of bread.

(4) *Peronosporos*, the most important of which is the *P. infestans*, that causes potato disease.

As a rule these fungii are only found on foods of vegetable origin. Animal food is subject to alterations from microbes, some of which are present in the living organism, others only develop in the food-stuff, but both give rise to a series of active principles that have poisonous properties, and which are known as *toxines*. Some of these toxines are termed *toxalbumines*, and are found in certain plants and in snake-poison. The majority of toxines are formed by anærobic organisms, and are met with in putrefaction ; they are classified as Ptomaines, amongst which the most important are :—

(1) Cadaverine, which was isolated by Brieger from decomposing bodies. It is only slightly poisonous, causing salivation and flow of tears.

(2) Mydaleine, also a product of putrefaction ; it gives rise to febrile symptoms, stimulates the excretions, causes progressive paralysis, and death from heart failure.

(3) Nervine and choline, which are produced in the process of putrefaction, at the expense of the lecithin in the brain, nerves, and blood corpuscles. Nervine is a powerful poison, ten milligrammes having, according to Mosselman, killed a cat. It causes salivation and excretion of tears, with quickening of the heart-beats and respirations, followed by collapse, convulsions, and death. Choline is twenty times less poisonous.

(4) Muscarine is found in certain fungii and toad stools, and by Brieger in fish in the early stages of decomposition. It causes death from heart failure.

(5) Methylgadinine is found in decomposing horse-flesh. It causes stoppage of the heart during the diastole.

(6) Parvoline also has been extracted from putrid horse-flesh by Gautier.

There are a number of other alkaloids, but their action is most imperfectly understood. Numerous ones are elaborated by the living

cells, and are found in the excretions, and are the cause of auto-intoxication. They receive the generic name of *leucomaines*.

Etiology.—Cases of poisoning of this nature in the herbivora are caused by animals eating plants attacked with rust or smut, especially when the food is mouldy, such as potatoes, beet-roots, turnips, or damaged grain.

In the carnivora poisoning arises from microbic alterations in flesh foods that have been provided from diseased animals or decomposing meat. Fowls suffer from this cause.

In some cases poisoning takes place from fermentation of the contents of the stomach and intestines (stercoræmia).

The effects of eating altered or damaged food vary greatly with the animal, the quantity taken, and what it has been accustomed to eat, as, for instance, dogs, who eat decomposed food without any ill results, where the same will kill pigs and fowls. Usually there are digestive troubles of varying degrees, running on into severe gastro-enteritis, with marked effects on the nerves and kidneys.

Symptoms.—The usual symptoms are loss of appetite, salivation, abdominal pains, tympanitis, and constipation, followed by profuse fœtid diarrhœa, often tinged with blood, polyuria, vertigo, rigors, muscular spasms, and paralysis of the tongue and pharynx, with amaurosis. There generally is a certain amount of fever, the pulse is quick, small and irregular, and the respirations laboured and painful.

In the carnivora there is acute gastric enteritis, with vomiting, profuse blood-stained diarrhœa, high fever, intense thirst, great depression, and death in a few hours. In the human being there is paralysis of the muscles of the eye (ptosis), the pharynx, and intestines.

Treatment.—The intestines must be emptied. Saline purgatives are indicated for ruminants, and emetics for the carnivora. Calomel, which is both a purgative and antiseptic, is especially valuable; stimulants, such as coffee, alcohol and camphor, also are useful.

Post mortem.—There are no very characteristic lesions, usually they consist of extensive gastro-enteritis, with hæmorrhage, the contents of the stomach consisting of partly digested food mixed with blood, and being exceedingly fœtid.

There also is nephritis, congestion of the brain and spinal cord, and, if the case is of any standing, degenerative processes have set in. The body after death rapidly decomposes.

Fröhner mentions a case of several horses being poisoned by mouldy hay in which the only lesions that could be found were slight discolouration of the muscles of the heart.

Chemical Analysis—Is not satisfactory, as certain principles, notably *lucomaines*, can be extracted from the normal tissues, urine, liver, &c. Animal alkaloids give many similar reactions to those of vegetable origin, and for this reason errors are likely to occur.

There are many other substances that give rise to poisoning in the domestic animals, but they are exceedingly rare, and many so little understood as to be not worth mentioning in a small work of this nature, and they have been omitted as they belong more to the domains of hygiene or general pathology.

Translations and Extracts.

INFECTIOUS ANGINA.

BY GUERRUAU.

THE cases occurred in September, 1901, amongst the adult horses of a French cavalry regiment that was taking part in some manœuvres. About 100 horses were attacked, but only half were laid up more than a few days. The epizootic disappeared after a short time without causing a single death.

Symptoms were: depression, loss of appetite, conjunctiva yellow and flow of tears, temperature 38·5° to 40° Cent., throat painful on pressure, painful cough, but no nasal discharge. All these symptoms disappeared in from three to four days. The epizootic was confined to the one regiment.

Recueil d'Hygiene et de Medecin Veterinaires Militaires, vol. vi., 1905.

PORTION OF A SWORD BLADE RETAINED IN THE PERITONEAL CAVITY FOR FOUR AND A HALF YEARS.

THE patient received a wound from a sword in the quarter on July 17, 1896, the weapon broke, and the point, which could not be found, remained in the wound, which healed up on July 23. It opened out again between August 1 and 31, 1896, and between July 8 and 17, 1897, the parts around became hot and swollen. Between February 11 and 15, 1899, he suffered from an attack of hæmaturia. On January 25, 1901, he died from peritonitis, but excepting for these short attacks of illness the horse remained in health and worked well.

On making a *post-mortem* examination, there were about fifteen pints of fluid in the peritoneum and the point of the sword, 7½ inches long. Between the bladder and the left side of the pelvis was a mass of hard tissue, in the centre of which was a cavity that the sword blade had lodged in. The peritoneum surrounding the opening was ruptured and studded over with ecchymosed patches.

Recueil d'Hygiene et de Medecin Veterinaires Militaires, vol. vi., 1905.

TWO CASES OF INTESTINAL OBSTRUCTION TREATED BY INTERNAL MASSAGE.

BY DR. P. FERRETT, VETERINAIRE, EN 1ER 4M CHASSEURS.

INTERNAL massage, the good results of which in flatulent colic I have already written about (*Revue Générale de Médecine Vétérinaire*), appears to be equally useful in intestinal obstruction, although relief is slower and patience must be exercised.

CASE I.—Horse, 6 years old, sent in from work on December 13, at 8 a.m., suffering from colic. From inquiries it appeared that he had not taken his morning feed. The abdomen was slightly distended, the conjunctiva red, pulse quick and hard, respirations short and quick, great pain, the animal throwing himself down and rolling

violently. Six to seven litres of blood were taken, and two hours after the patient became quiet. At 1 p.m. he again became worse, lying down, looking round at his flank, groaning, and rolling over on the bedding. The pulse and respirations remained normal.

Internal massage was commenced at 2 p.m., the parts of the bowel within reach were not tympanitic or loaded with food. Massage for from ten to fifteen minutes was given every half hour to 10 p.m., and commenced next morning at 7 till 11 and again from 7 to 9 p.m. During and after each application a small quantity of flatus escaped. There were violent expulsive efforts and groans, especially on the first introduction of the hand.

On the evening of December 13 the pain was worse, groaning more frequent, and the pulse harder and fuller without being quicker, but no fæces were passed. During the night the horse lay fairly quiet, only occasionally rolling over.

On the morning of the 14th, at 7 a.m., the horse was still down, and the prognosis looked exceedingly bad. The pulse was quick, small, and intermittent, the respiration eighteen to twenty per minute, abdomen tucked up, and the patient looking round at his flank, groaning, and from time to time rolling over. From the appearances it looked as if peritonitis had set in. During the day three injections of cocaine were given, the first of 1 gramme, the other two of half a gramme each. At 3 p.m., while internal massage was being given, a violent expulsive effort was made, and a single pellet of fæces was passed. It was dark, dry and hard, and when thrown on the ground did not break up, and in about an hour afterwards a mass composed of similar pellets, the size of the two clenched fists, followed.

The whole of the symptoms and surroundings of the case pointed to intestinal obstruction, complicated with peritonitis, so 500 grammes of sweet oil with ten drops of croton were given.

At 6 p.m. another motion was passed, and at 7 o'clock, although the character of the pulse had not changed, the animal was better, the pain lessened, respirations easier, and groaning ceased. A small quantity of hay tea and thirty grammes of acetate of ammonia were administered.

On the 15th the patient was convalescent and did well, but, unfortunately, on the morning of December 22 he was found dead in the stable, having got cast in the stall and been choked with the head rope in the night.

Post-mortem.—The head was greatly bruised and the eyelids swollen, the whole of the subcutaneous tissue being infiltrated with a yellow serum. Over the left temporal frame there was a wound 4 inches by 2 inches that was in process of granulation, but it and certain others were no doubt caused during the attack of colic a week previous. There was also a considerable amount of ecchymosis on the left side of the neck.

The trachea contained a quantity of pink froth, and the mucous membrane was congested in places. The left lung was congested, and there were patches of emphysema in the anterior lobule. There was about half a litre of yellow-coloured serum in the abdomen. The small intestines and diaphragmatic curvature of the large intestines were adherent to the peritoneum by a number of fine bands, especially in the neighbourhood of the diaphragm and last ribs. At about 8

inches from the cæcum the small intestine formed a loop about 30 inches in length, and was united by a fibrous band. When the band was divided and the two portions of the gut liberated it was seen that the adhesion was firmer at the part farthest from the cæcum, and at this spot only were there any lesions observed in the lining membrane of the intestine.

The band was formed of a deep red tissue, studded over with black and yellow patches, the latter apparently formed out of fibrine. It was $3\frac{1}{2}$ inches wide on the intestine and $6\frac{1}{2}$ on the mesentery.

On the lining mucous membrane of the bowel there was an ulcerated patch, $4\frac{3}{4}$ inches by $3\frac{1}{2}$ inches, extending down to the muscular coat, which was exposed, and which was of a yellow colour, studded over with black points. Round it were several small ulcers, some circular, others irregular in shape, and the mesenteric glands in the neighbourhood were soft and smaller. In all probability the ulceration was caused by pressure from the hardened fæces.

Case II.—Horse, 9 years old, attacked with colic on January 9, at 10 a.m. The animal lay down, occasionally looking round at his flank; the respirations and pulse were not disturbing. Fifty grammes of tincture of opium were given, and during the rest of the day the patient seemed fairly easy. On January 10 the symptoms became greatly aggravated. The animal was throwing himself about violently, but the pulse was good, the respirations sixteen to seventeen per minute.

On examination *per rectum* this part of the bowel was found to be empty, but the colon distended by gas, and in the floating portion several hard round masses were detected.

The same treatment as in the former case was adopted, viz., massage for fifteen minutes repeated every half-hour. During the day urine and flatus were passed, and there was violent straining, but the large intestine remained distended and no fæces were passed. At 10 p.m. there were still acute pain and groaning, but the pulse remained strong and regular.

On January 11, at 7 a.m., the state was the same. A grain of caffeine was given hypodermically, and massage recommenced. At 9 a.m. several hard, black, dry pellets were passed, and more an hour later. At mid-day there was a free passage of fæces and flatus, and the large intestine resumed its normal size. At 5 p.m. the animal was out of danger.

Conclusions.—It would appear that internal massage is indicated in those forms of internal obstruction which commence at some times with acute pain and disturbance of the respiration and circulation, at others with but slight disturbance, but severe times symptoms soon appearing. Internal massage induces expulsive efforts and increases the peristal action of the bowels, which have been in abeyance. It also appears to stimulate the excretion of the intestinal glands, as the posterior portions of the colon and the rectum contain more fluid after than before the process.

(*Revue Générale de Médecine Vétérinaire*, May 15th, 1905.)

Reviews.

CATTLE TUBERCULOSIS. By HAROLD SESSIONS, F.R.C.V.S., F.H.A.S. Second Edition. 130 pages. Published by Baillière, Tindall and Cox. Price, 2s. net.

This little work, of which the first edition was published some seven years ago in conjunction with Dr. Legge, has now been entirely rewritten in order to bring it up to date. The present author has added much of practical utility and interest, not only to the veterinary surgeon but also to the agriculturist and meat inspector.

The first chapter deals with the relation which exists between human and bovine tuberculosis, and Mr. Sessions is particularly emphatic in regard to the infection which is liable to take place from infected milk. The subject of milk inspection receives a chapter to itself, as also does the inspection of meat. The tuberculin test is discussed both in regard to its reliability for discovering the disease and as a means of keeping a herd clean, and in connection with this there is one paragraph which is particularly worth quoting. On page 50 the author says: "Tuberculin should be supplied direct from the Government, and no other kind should be used. It should be supplied only to the County Veterinary Inspector, and he should be empowered to supply veterinary surgeons free of charge, a return on a schedule being made to him of the place and time it was used and the results obtained. All cattle tested should have a tag or brand put on the ear. Where a herd has been tested the inspector should see that the animals are kept apart, and if a cow's milk is being used, particular care should be exercised as to the condition of the udder. To sell milk from a cow with a diseased udder, or to drive an animal along a highway when it shows symptoms of the disease, should be made a penal offence."

Tuberculosis finds more victims each year both amongst human and bovine patients than any other disease, and it cannot be too widely known that it is essentially contagious, and that, at all events amongst animals, it can be detected and stamped out. The information in the book is put clearly and plainly, and is easily understandable by those for whom it is written. It is neatly bound and got up, and the price makes it within the reach of everybody.

Personal.

MR. HENRY C. WILKIE, F.R.C.V.S., F.Z.S., one of the veterinary inspectors to the New Zealand Government, has recently been elected an Honorary Life Fellow of the Zoological Society for services rendered in connection with ornithological work in New Zealand. Mr. Wilkie is to be congratulated on this rare distinction, as only forty-two honorary fellows have been elected since 1862. Formerly in practice at Chatteris, in Cambridgeshire, Mr. Wilkie joined the New Zealand Government Veterinary Service about six or seven years ago, and has now become one of its most valued officers; he has recently published a series of diagrams on animal anatomical subjects for lecture purposes. At the present time Mr. Wilkie is taking a course of several months' study at the Pasteur Institute in Paris.

AMONGST the names of those who were elected on Monday, October 23, to the Council of the Royal Society of Edinburgh was that of Dr. D. Nöel Paton, F.R.C.P.E., the late professor of physiology at the Royal (Dick) Veterinary College, and at the present time one of the examiners in this subject for the Royal College of Veterinary Surgeons. Dr. Paton has recently published a work on veterinary physiology, the title of the book being "Essentials of Physiology for Veterinary Students."

———

MISS ALEEN CUST, whose enthusiasm for the veterinary profession led her to matriculate and complete the four years' course of collegiate study, and whose desire to become a properly qualified British veterinary graduate was only frustrated by the ungallant refusal of the Council of the Royal College of Veterinary Surgeons to allow a female student to sit for the professional examinations, was, on October 31, elected to the position of veterinary inspector to the Mount Bellew union, in the county of Galway.

———

MISS CUST passed a most distinguished college career, carrying off a large share of the medals and class prizes; she is a fluent German and French scholar, and has devoted the past five years to assistantship work in various large and well-mixed practices in Scotland and Ireland, gaining an especial reputation for skill in surgical work. Refusing the opportunity of qualifying in France or America (both of which countries allow lady veterinary graduates), and also the opportunity of graduating in human medicine, Miss Cust has always hoped that the English veterinary profession would eventually open its doors to lady members. Up to the present time the door has been closed, and it will be interesting to see what will be the upshot of this appointment. The election was made by the Galway County Council, three candidates presenting themselves, and will have to receive the sanction of the Department of Agriculture in Dublin before being legally completed. The position is worth £40 per annum.

———

PROFESSOR BAYNE'S LABORATORY FUND.—Knowing that through adverse circumstances Professor Bayne, F.C.S., who was for many years demonstrator and professor of chemistry in the Royal Veterinary College, London, has been compelled to give up the laboratory from which he had endeavoured to establish a consulting practice in analytical work, and that pecuniary difficulties prevented him from taking other suitable premises, a number of friends and old pupils have formed themselves into a committee to receive subscriptions with the object of aiding Professor Bayne to make a fresh start. All funds received will be accounted for in a business-like manner and spent to the best advantage, and a complete list of the committee will be published in the *Veterinary Record* and in this Journal. The number of the committee is not yet complete, and the editors of the *Veterinary Record* and of *The Veterinary Journal* respectively will be glad to receive the names of any friends or old pupils of Professor Bayne who will be willing to act, and at the same time any additions to the subscription fund will be acknowledged.

Correspondence.

To the Editor of THE VETERINARY JOURNAL.

"TWO CURIOUS ACCIDENTS."

DEAR SIR,—In the September number of the Journal, under the above heading, you gave photographs of two curious accidents—the second one in which you say you are indebted to Mr. M. Graham. As a matter of fact, the original photograph is mine, and, as I gave several copies away, no doubt one of them got into Mr. Graham's hands.

It occurred while quartered with my regiment, the 20th Hussars, at Manchester, in 1879. The horse was a five-year-old charger, which I purchased six weeks previous from Cox, the London dealer, for Lieutenant Sir John Burke, and was just breaking. A temporary box was made for him in one of the troop stables, by boarding up two stalls and placing two wooden rails in front. During the night he was nibbling with the lower bar, and his head over the top one, when his incisor teeth got caught, and flying back fell and broke his neck. The odontoid process was torn from its socket and death was no doubt instantaneous. I was called to see this horse at 6 o'clock in the morning, and before he was moved had the photograph taken.

I exhibited the vertebræ, and read some notes on the case, at the meeting of the Lancashire Veterinary Medical Society on October 15, a few days after the accident.

The horse was neither a "cribbiter" or "windsucker."

WM. PALLIN, F.R.C.V.S.

The Curragh, Ireland.

Books and Periodicals, &c., received.

Department of Agriculture for Ireland; Board of Agriculture (England) Returns; Journal of the Royal Army Medical Corps; Revue Générale de Médecine Vétérinaire; The Transvaal Agricultural Journal; Le Bulletin Vétérinaire; American Veterinary Review; Western Veterinarian; Essentials of Veterinary Physiology (Dr. Paton); Neumann's Parasites of the Domesticated Animals; La Clinica Vétérinaira; Berliner Tierarztliche Wochenschrift; Receuil de Méd. Vét.; Deutsche Tierarztliche Wochenschrift; Allatorvosi Lapok (Veterinarius).

Letters and Communications, &c.

Captain Pallin; Mr. T. Foulkes; Mr. Hatch; Mr. Wilkie; Professor O'Connor; Mr. Bryne; Mr. T. Hibbard; Mr. W. Pauer; Colonel Nunn; Mr. Lewis Green; Mr. Woodward.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements), should be addressed to the Editor.

Manuscript—preferably type-written—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

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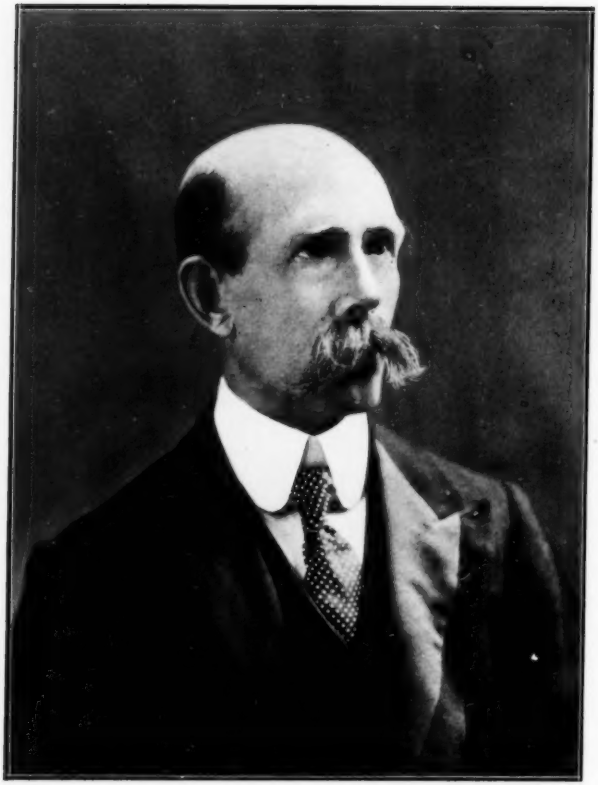

PROFESSOR SIR JOHN McFADYEAN, M.B., C.M., B.Sc., M.R.C.V.S., F.R.S.E.
Principal and Dean of the Royal Veterinary College, London.